

BA215 Enclosure Maintenance

Order Number EK-191AA-MG-001

**digital equipment corporation
maynard, massachusetts**

October 1988

The information in this document is subject to change without notice and should not be construed as a commitment by Digital Equipment Corporation.

Digital Equipment Corporation assumes no responsibility for any errors that may appear in this document.

The software, if any, described in this document is furnished under a license and may be used or copied only in accordance with the terms of such license. No responsibility is assumed for the use or reliability of software or equipment that is not supplied by Digital Equipment Corporation or its affiliated companies.

© Digital Equipment Corporation. 1988. All rights reserved.

Printed in U.S.A.

The READER'S COMMENTS form on the last page of this document requests the user's critical evaluation to assist in preparing future documentation.

The following are trademarks of Digital Equipment Corporation:

DEC	MicroVAX	ULTRIX
DECmate	MicroVMS	UNIBUS
DECnet	PDP	VAX
DECUS	P/OS	VAXBI
DECwriter	Professional	VAXELN
DELNI	Q-bus	VAXcluster
DEQNA	Rainbow	VAXstation
DESTA	RSTS	VMS
DIBOL	RSX	VT
MASSBUS	RT	Work Processor
MicroPDP-11	ThinWire	digital

ML-S979

FCC NOTICE: The equipment described in this manual generates, uses, and may emit radio frequency energy. The equipment has been type tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such radio frequency interference when operated in a commercial environment. Operation of this equipment in a residential area may cause interference, in which case the user at his own expense may be required to take measures to correct the interference.

Contents

Preface

vii

Chapter 1 BA215 Enclosure Description

1.1	Introduction	1-1
1.2	Modules	1-3
1.2.1	Filler Panel for Covers and Flush Handles	1-6
1.2.2	Support Panel for Dual-Height Modules	1-6
1.3	Mass Storage	1-6
1.4	Backplane	1-11
1.5	System Controls and Indicators	1-12
1.6	Operator Control Panel (OCP)	1-13
1.7	Power Supply	1-17
1.8	AC Line Filter and Fans	1-21
1.9	Configuration Guidelines	1-22
1.9.1	Module Order and Configuration	1-23
1.9.2	Configuration Worksheet	1-23

Chapter 2 Installation

2.1	Introduction	2-1
2.2	Site Preparation	2-1
2.2.1	Clearance Requirements	2-1
2.2.2	Acoustics	2-2
2.2.3	Heat Dissipation	2-3
2.2.4	Electrical Requirements	2-3
2.3	Unpacking the Shipment	2-4
2.4	Connecting Devices	2-6
2.5	Setting System Controls	2-9
2.6	Connecting the Power Cord	2-9
2.7	Attaching the Front Panel	2-9

Chapter 3 FRU Removal and Replacement

3.1	Introduction	3-1
3.2	List of BA215 Enclosure FRUs	3-1
3.3	Accessing FRUs	3-3
3.3.1	Removing the Front Panel	3-3
3.3.2	Removing the Media Faceplate	3-4
3.3.3	Removing the Side and Top Panel Unit	3-7
3.3.4	Removing the Safety Plate	3-8
3.4	Removal Procedures for BA215 Enclosure FRUs	3-10
3.4.1	Modules with Bulkhead Handles	3-10
3.4.2	Modules with Covers	3-13
3.4.3	CPU I/O Panel	3-13
3.4.4	Operator Control Panel (OCP)	3-15
3.4.5	RF-Series Disk Drive	3-17
3.4.6	TK-Series Tape Drive	3-22
3.4.7	Power Supply	3-24
3.4.8	Fan Tray Assembly	3-27
3.4.9	On/Off Switch Assembly	3-28
3.4.10	Backplane	3-30

Appendix A Related Documentation

Index

Figures

1-1	BA215 Enclosure, Pedestal	1-1
1-2	BA215 Enclosure Components	1-2
1-3	BA200-Series Handles and Covers	1-4
1-4	BA215 Mass Storage Area	1-7
1-5	BA215 External Device Connector with DSSI Terminator	1-8
1-6	Sliding Tracks, RF and TK Drives (Example)	1-9

1-7	BA215 Mass Storage Configuration (Example)	1-10
1-8	BA215 Backplane	1-11
1-9	BA215 Front Panel Key Positions	1-13
1-10	BA215 Operator Control Panel (OCP)	1-14
1-11	BA215 RF-Series OCP, Front and Rear	1-15
1-12	BA215 Power Supply	1-18
1-13	BA215 Power Supply Timing Diagram	1-19
1-14	Power Supply Cable to DSSI Mass Storage Devices	1-20
1-15	BA215 Fan Tray Assembly	1-22
1-16	BA215 Configuration Worksheet	1-25
2-1	BA215 Pedestal Dimensions	2-2
2-2	Sliding the BA215 Enclosure into Place	2-5
2-3	H3602-SA I/O Panel (Example)	2-7
2-4	Cable Connections, CXA16 Module (Example)	2-8
2-5	BA215 Front Panel Release Latch	2-10
3-1	Removing the BA215 Front Panel (Pedestal)	3-4
3-2	Removing the Media Faceplate	3-5
3-3	BA215 Shipping Bracket Screws	3-6
3-4	Removing the BA215 Side and Top Panel Unit	3-8
3-5	Removing the Safety Plate	3-9
3-6	Unlocking the Release Levers	3-11
3-7	Attaching the Filler Panel (Example)	3-12
3-8	H3602-SA I/O Panel (Example)	3-14
3-9	Lowering the OCP	3-16
3-10	Removing the OCP, RF Drives	3-17
3-11	Removing the OCP Cabling	3-18
3-12	Removing the RF-Series Drive Cabling	3-19
3-13	Removing an RF-Series Disk Drive	3-20
3-14	RF30 ID Switches	3-21
3-15	Removing the TK-Series Drive	3-22
3-16	Removing the TK-Series Drive Cabling	3-23
3-17	Removing the Power Supply Cabling and Screws	3-25
3-18	Removing the Power Supply	3-26
3-19	Removing the Fan Tray Assembly	3-27
3-20	Removing the Fan Cable from the Fan Tray Assembly	3-28
3-21	On/Off Switch Assembly Screws	3-29

3-22	Disconnecting the Backplane Cables	3-30
3-23	Removing the Backplane	3-31

Tables

1-1	BA200-Series Module Handles and Covers	1-5
1-2	BA215 Enclosure Mass Storage Devices	1-8
1-3	BA215 Backplane Connectors	1-12
1-4	BA215 Front Panel Key Positions	1-13
1-5	RF-Series Drives, Controls and Indicators	1-16
1-6	BA215 OCP Connectors	1-17
1-7	BA215 Power Supply Controls and Indicators	1-20
1-8	Power and Bus Load Data	1-24
2-1	BA215 Electrical Requirements	2-3
2-2	240 Vac Power Cords	2-3
3-1	BA215 Enclosure FRUs	3-2
3-2	System-Specific BA215 FRUs	3-2
3-3	BA215 Shock-Mounting Hardware	3-3
3-4	RF30 Switch Settings	3-21

Preface

This guide provides reference, installation, and maintenance information for the BA215 enclosure. This enclosure is intended for MicroPDP-11 and MicroVAX systems.

Intended Audience

This document is intended only for DIGITAL Field Service personnel and qualified self-maintenance customers.

Organization

This guide has three chapters and one appendix.

Chapter 1 provides an overview of the system enclosure, describing the module handles and covers, mass storage capacity and cabling, controls and indicators, backplane, power distribution, and configuration guidelines.

Chapter 2 lists site preparation considerations and shows how to install the BA215 pedestal system.

Chapter 3 describes how to remove and replace BA215 field replaceable units (FRUs). The beginning of the chapter contains a list of these FRUs.

Appendix A provides a list of related documentation.

Warnings, Cautions, and Notes

Warnings, cautions, and notes appear throughout this guide. They have the following meanings:

- | | |
|----------------|--|
| WARNING | Provides information to prevent personal injury. |
| CAUTION | Provides information to prevent damage to equipment or software. |
| NOTE | Provides general information about the current topic. |

Chapter 1

BA215 Enclosure Description

1.1 Introduction

The BA215 enclosure is a member of the BA200-series of enclosures, and is available in a pedestal for office use or in a wall mount configuration that conforms to NEMA (National Electronics Manufacturing Association) standards. The pedestal version is shown in Figure 1-1.

The BA215 enclosure has a six-slot backplane, an operator control panel (OCP), a CPU I/O panel, a power supply, two fans, and a mass storage area that supports DIGITAL Small Storage Interconnect (DSSI) mass storage devices. These components are shown in Figure 1-2.

Figure 1-1: BA215 Enclosure, Pedestal

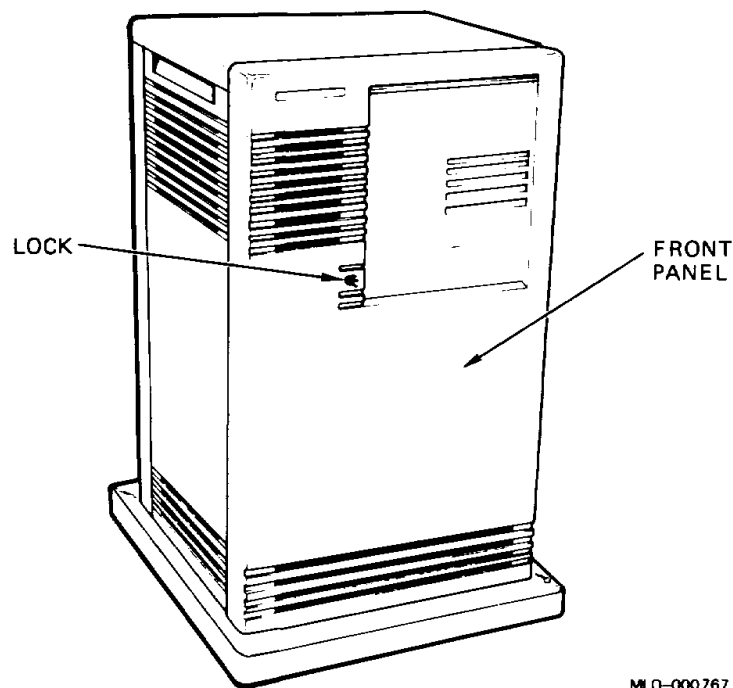
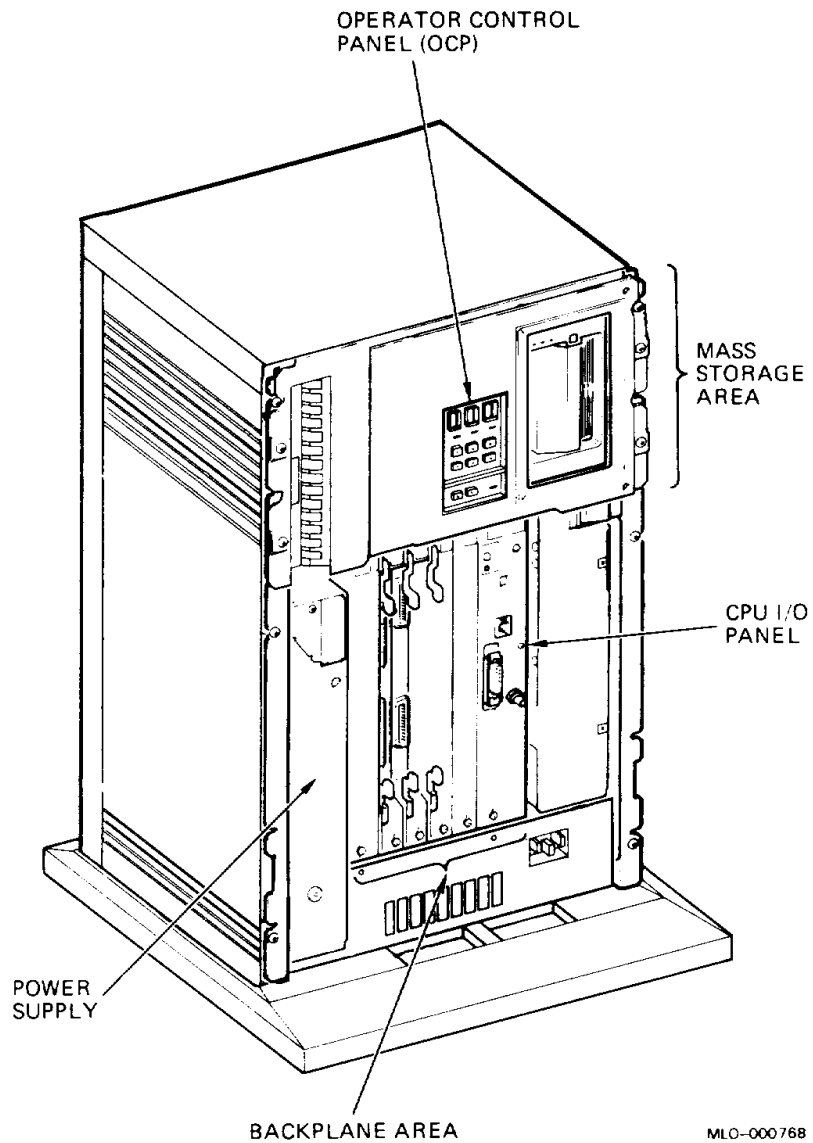


Figure 1-2: BA215 Enclosure Components



MLO-000768

1.2 Modules

There are two main differences between modules used in a BA200-series enclosure and those used in other Q22-bus system enclosures:

- Option modules with external I/O connectors have bulkhead handles. These handles replace the insert panels and internal cabling found in the BA23 and BA123 enclosures. This design is easier to maintain because it eliminates problems caused by faulty internal cabling.
- Non-I/O modules (such as memory modules) have blank bulkhead covers.

The module handles and covers form an electrical seal that complies with regulations for electromagnetic interference (EMI) for: (1) keeping radio frequency interference generated by the system in the enclosure, and (2) keeping external radio frequencies from entering the enclosure. The module handles and blank covers also help maintain proper airflow.

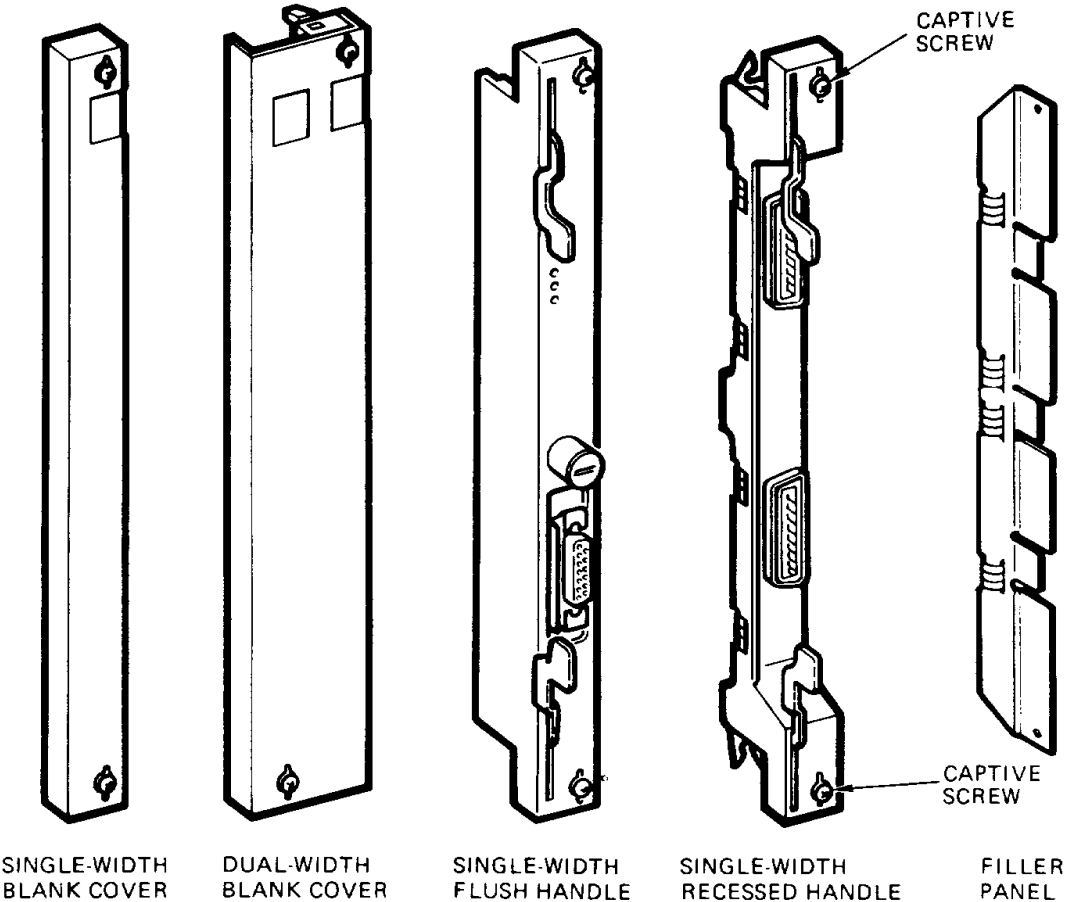
Four basic types of handles and covers are used for BA200-series compatible modules (Figure 1–3):

- Single-width blank covers
- Dual-width blank covers
- Single-width flush handle
- Single-width recessed handle

Each handle or cover has two quarter-turn, Phillips-head captive screws to secure the module to the card cage (Figure 1–3). Module handles have release levers to help install or remove the module from the card cage.

Some modules have special configurations, for example the dual-width CPU I/O panel. Table 1–1 describes common module handle and cover variations.

Figure 1–3: BA200-Series Handles and Covers



MLO-000769

Table 1–1: BA200-Series Module Handles and Covers

Part	Part Number	Description
Single-width blank cover	70-23981-01	<p>Covers one backplane slot in the following cases:</p> <p>Covers a standard Q22-bus module that does not have external I/O connectors (for example, a memory module).</p> <p>Covers an unused slot (slots 3, 4, or 5).</p> <p>If you install this type of cover next to a module with a recessed handle, you must add a metal filler panel to maintain compliance for EMI. See Section 1.2.1.</p>
Single-width blank cover	70-23981-04	<p>Covers one backplane slot in the following cases:</p> <p>Covers a standard Q22-bus module that does not have external I/O connectors (for example, a memory module) in slot 6. Contains an opening at the top to allow a cable from the tape controller to be routed to the mass storage area.</p> <p>Covers slot 6 (unused).</p> <p>If you install this type of cover next to a module with a recessed handle, you must add a metal filler panel to maintain compliance for EMI. See Section 1.2.1.</p>
Single-width recessed handle	–	<p>Used on modules designed for BA200-series enclosures. The handle is riveted to the module. This style is the preferred handle for all BA215 modules with external I/O connectors. The CXA16 and CXY08 communication modules use this type of handle.</p>
Single-width flush handle	–	<p>Used when a recessed handle would interfere with the module circuitry or I/O connector. The flush handle is also riveted to the module. The KDJ11-S (a MicroPDP-11 processor) and DEQNA-S (Ethernet controller) have flush handles.</p>
Dual-width CPU I/O panel	H3600-SA	<p>Connects to the KA630 and KA650 CPU modules via a ribbon cable with two connectors.</p>
Dual-width CPU I/O panel	H3601-SA	<p>Connects to the KDJ11-BF CPU module via a ribbon cable with two connectors.</p>
Dual-width CPU I/O panel	H3602-SA	<p>Connects to the KA640 CPU module 50-pin connector via a keyed ribbon cable.</p>

1.2.1 Filler Panel for Covers and Flush Handles

When you install a module with a blank cover or flush handle next to a module with a recessed handle, you *must* install a filler panel (Figure 1–3) between the modules to meet regulations for EMI. Without the filler panel, circuitry on the recessed-handle module is exposed. The filler panel kit (70–24505–01) consists of two filler panels that contain sets of finger stock to provide an effective chassis ground between the handles. Flush handles, recessed handles, and covers have screw holes at the top and bottom for installing the filler panel.

1.2.2 Support Panel for Dual-Height Modules

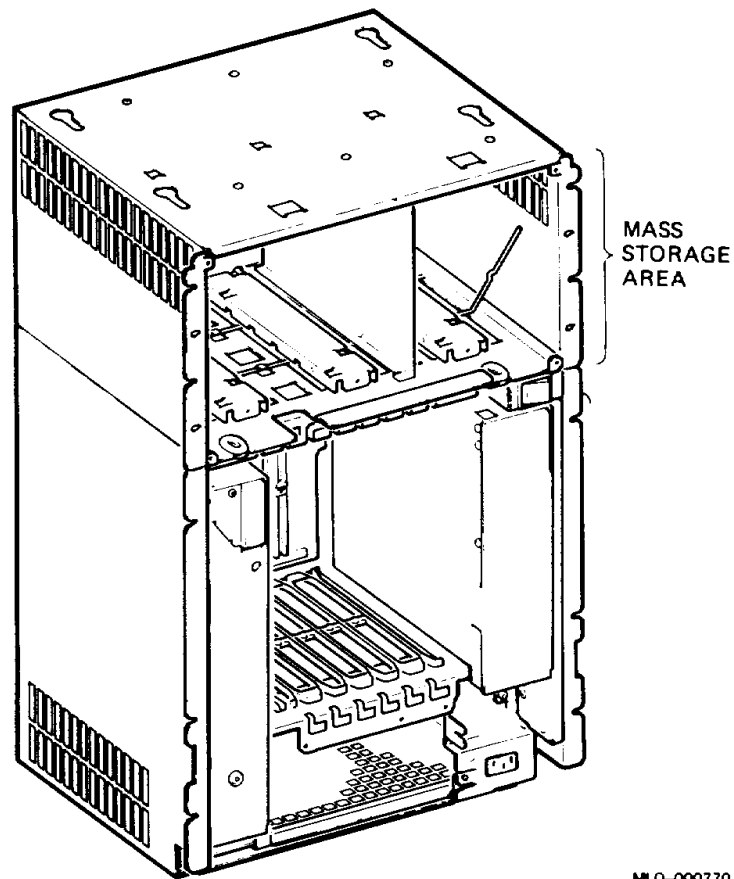
A plastic panel (74–33507–01) provides extra support for dual-height modules in the BA200-series card cage. Dual-height modules are always installed in the AB rows of a slot. The panel plugs into the CD rows, below the dual-height module in the AB rows, to provide additional support. The panel has a groove along the top edge to support the dual-height module above it.

1.3 Mass Storage

The BA215 enclosure has a mass storage area above the card cage (Figure 1–4). The mass storage area contains two full-height mounting slots.

The BA215 can contain a combination of 13.3-cm (5.25-in) DIGITAL Small Storage Interconnect (DSSI) mass storage devices, both half-height (41.4 mm; 1.63 in) and full-height (8.25 mm; 3.25 in). For example, one TK50 tape drive (full-height) and two RF30 fixed-disk drives (half-height) can be installed, for a total data capacity of 395 Mbytes.

Figure 1-4: BA215 Mass Storage Area



MLO-000770

The DSSI supports up to seven storage devices, daisy chained to the host system through either the KA640 CPU or an adapter module such as the KFQSA.

A 50-pin connector for external devices is located on the left side of the mass storage area (Figure 1-5). This connector is used to connect the DSSI bus to external DSSI drives. When external devices are not present, a DSSI Honda terminator (12-29258-01) must be connected (Figure 1-5).

Figure 1–5: BA215 External Device Connector with DSSI Terminator

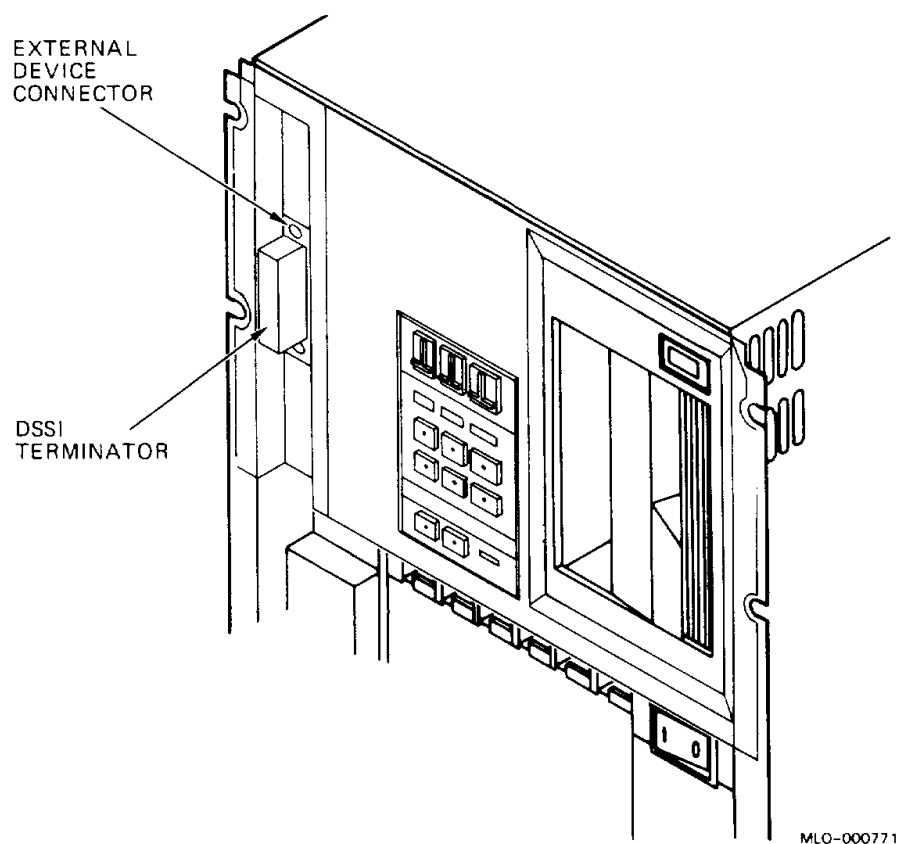


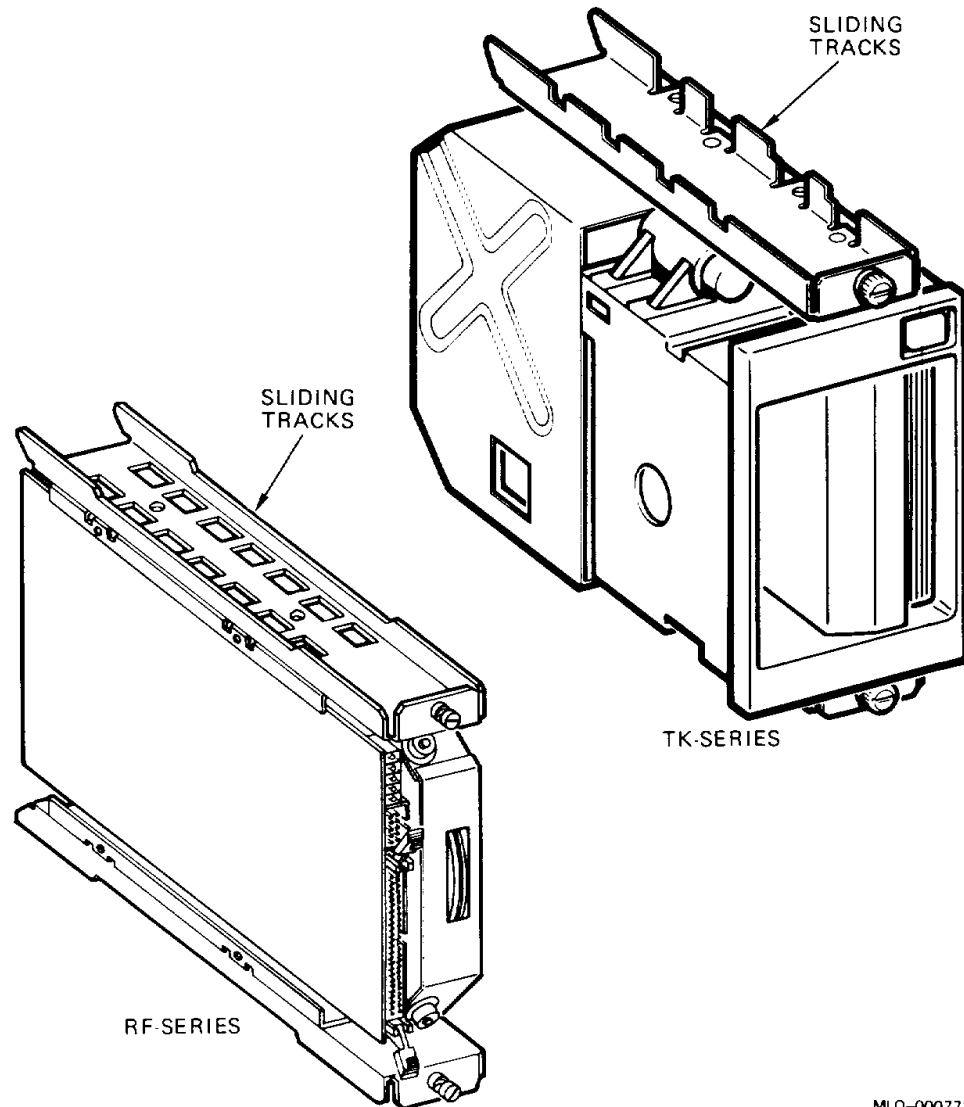
Table 1–2 lists and describes the BA215-supported mass storage devices.

Table 1–2: BA215 Enclosure Mass Storage Devices

Device/Capacity	Supported Drives (Max)	Description
TK50 (95 Mbytes)	1	Full-height cartridge tape drive. Installed in the right-hand slot.
RF30 (150 Mbytes)	2	Half-height DSSI disk drive. Installed in the left-hand slot(s).

Mass storage devices are mounted sideways on shock-mounting hardware (Figure 1-6). A sliding track is attached to each side of the mass storage device. One shock-resistant support is attached to the upper and lower part of the mass storage area by two captive screws enclosed in rubber shock bushings. The shock-mounting hardware varies, depending on the type of device. See Table 3-3 in Chapter 3 for a list of the shock-mounting hardware.

Figure 1-6: Sliding Tracks, RF and TK Drives (Example)

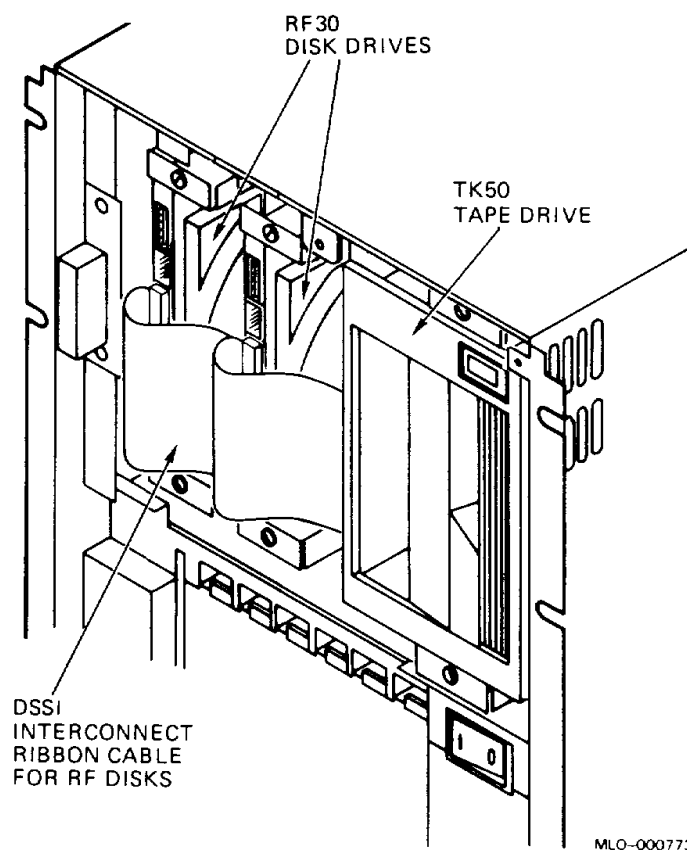


MLO-000772

Fixed-disk drives face the rear of the enclosure, providing easy access to drive signal and power cables. TK tape drives face the front of the enclosure, providing access to the controls and tape cartridge opening.

Figure 1-7 shows a typical BA215 enclosure configuration: one TK50 tape drive and two RF30 fixed-disk drives. Figure 1-7 also shows the 50-conductor, DSSI interconnect ribbon cable (17-01962-01), which connects the CPU DSSI connector (on the right side of the left storage area) to the first RF30, the second RF30, and the external device connector.

Figure 1-7: BA215 Mass Storage Configuration (Example)

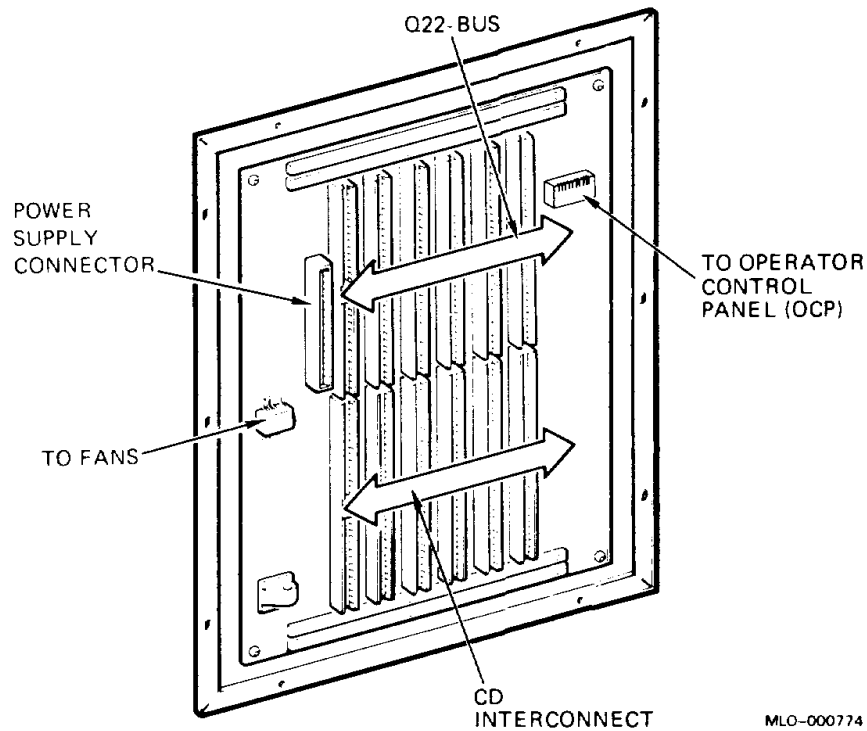


MLO-000773

1.4 Backplane

The BA215 enclosure has a six-slot, quad-height backplane (Figure 1–8). All six backplane slots are Q/CD slots. That is, the AB rows of all six slots contain the Q22-bus, and the CD rows of all slots contain the CD interconnect.

Figure 1–8: BA215 Backplane



MLO-000774

The backplane is bounded and cannot be expanded. It supports 33.5 equivalent ac loads and 20 dc loads. An *ac load* is the capacitance a module presents to a bus signal line. One ac load equals 9.35 picofarads (pf). A *dc load* is the dc leakage a module presents to a bus signal line. One dc load is approximately 105 microamperes (μA). The backplane presents 1.5 ac loads to the Q22-bus.

Table 1–3 describes the connectors on the backplane (Figure 1–8).

Table 1–3: BA215 Backplane Connectors

Connector	Function
56-pin edge board	Ribbon cable connects to the power supply, which distributes +5 Vdc and +12 Vdc to backplane slots.
10-pin connector	Ribbon cable connects to the operator control panel (OCP). Carries the DCOK, POK, +5 Vdc, and signal ground lines for the DC OK LED and disk activity lights.
5-pin power	Cable connects to the two dc fans housed in the ac line filter assembly.

1.5 System Controls and Indicators

The BA215 enclosure has the following controls and indicators:

- On/off power switch with ac power neon light
- DC OK LED
- System restart switch
- CPU halt button
- Mass storage device controls and indicators

These controls and indicators are located behind the smoke-grey plastic window on the front panel. The front panel has a three-position lock. You can lower the window by turning the lock's universal key to the middle or bottom position (Figure 1–9). The levels of access for the lock are listed in Table 1–4.

Figure 1–9: BA215 Front Panel Key Positions

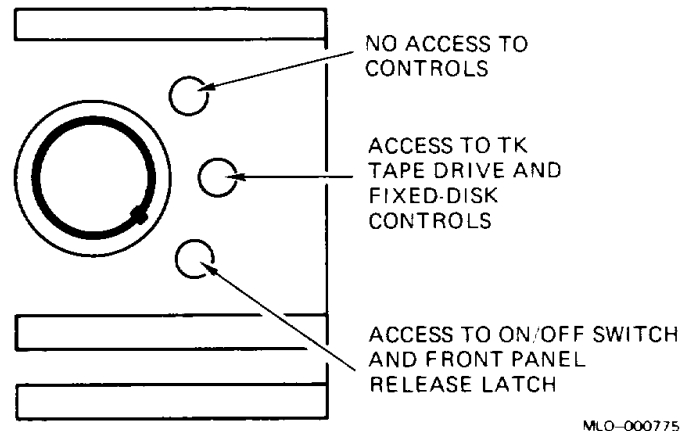


Table 1–4: BA215 Front Panel Key Positions

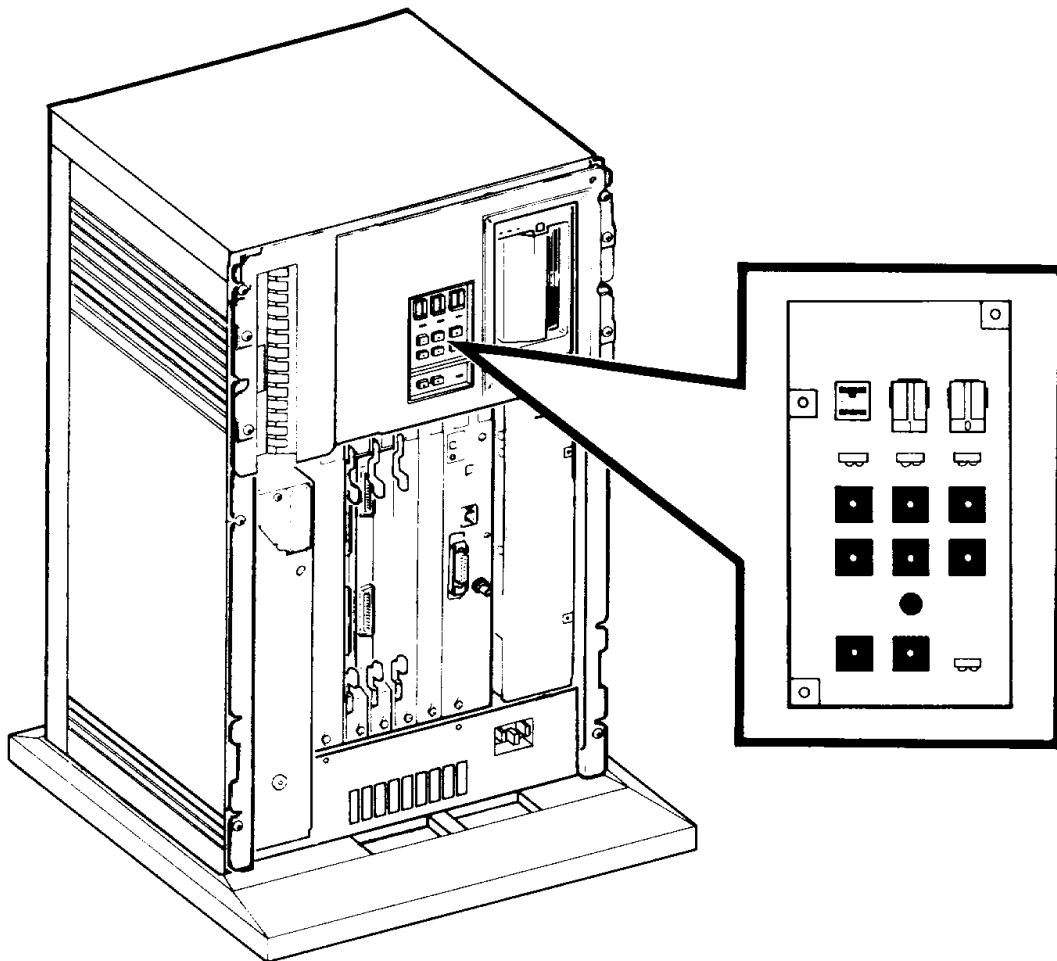
Key Position	Level of Access
Top	No access to controls. Disk, tape drive, and DC OK LEDs are visible.
Middle	Access to disk drive and tape drive controls (OCP).
Bottom	Access to on/off power switch and to release latch (to remove or replace front panel).

Additional controls, such as the console baud rate select switch and power-up mode switch, are located on the CPU I/O panel. These controls are accessible only by removing the front panel; they vary depending on the CPU. Refer to the applicable CPU maintenance documentation for a description of the controls on the CPU I/O panel.

1.6 Operator Control Panel (OCP)

The controls and indicators for the RF-series fixed-disk drives are located on the BA215 enclosure operator control panel (OCP), shown in Figure 1–10.

Figure 1–10: BA215 Operator Control Panel (OCP)

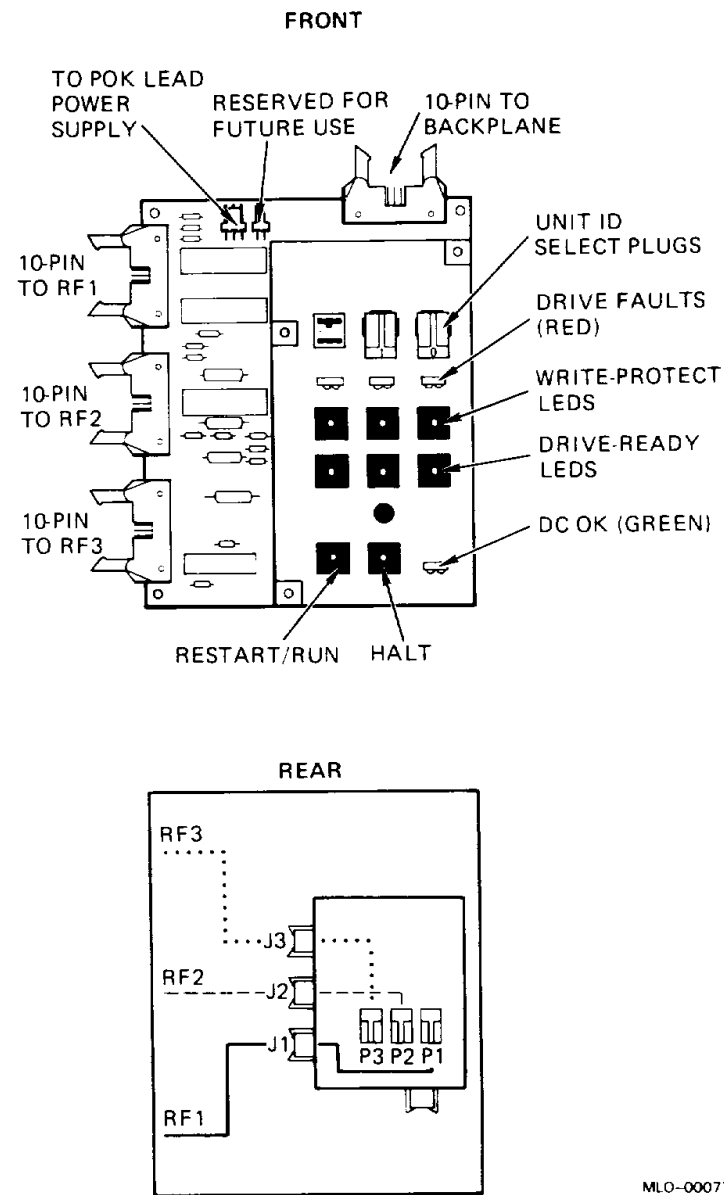


MLO-000776

Figure 1–11 shows the OCP from the front and the rear. The settings and functions are described in Table 1–5. The connectors are described in Table 1–6.

Standard system configurations use the write-protect buttons and the drive-ready LEDs in the right column for RF drive 1, and the buttons in the center column for RF drive 2. The left column of buttons and LEDs are reserved for future use.

Figure 1-11: BA215 RF-Series OCP, Front and Rear



MLO-000777

Table 1–5: RF-Series Drives, Controls and Indicators

OCP Description	Control Indicator	Setting	Function
Unit Number	Unit ID select sockets	Installed	Three sockets. There are eight unit ID select plugs numbered 0 through 7; normally, the DSSI controller is node 7. Each unit ID select plug sets the DSSI address to the number specified on the plug (normal operating position). The plug must be installed if the drive is present.
		Removed	DSSI address undefined. If drive is present, drive-fault LED lights.
Fault	Drive fault Red LED	On	Indicates a faulty drive or an undefined DSSI address.
		Off	Drive functioning correctly and DSSI address defined (normal operating position).
Write Protect	Write-protect LEDs	Out LED off	System can read from and write to the disk (normal operating position).
		In LED on	System cannot write to the disk, but can read from the disk.
Ready	Drive-ready LEDs	Out LED on	Disk is on line (normal operating position). System can read from and write to the disk.
		In LED off	Disk is off line. System cannot read from or write to the disk.
System	Restart/Run	–	Reinitializes system state. Reruns self-tests. Work in progress is lost.
	Halt	In LED on	CPU in console I/O mode. Console emulation program running.
		Out LED off	CPU can run system software (normal operating position).
	DC OK Green LED	On	DC voltage within tolerance.
		Off	DC voltage not present or not within tolerance.

Table 1–6: BA215 OCP Connectors

Connector	Location on OCP	Function
10-pin Berg	Left side	Three connectors, one for each RF drive. The RF connection paths are shown on the rear of the OCP, in Figure 1–11. (The RF3 drive, shown with dotted line, is for future use.)
3-pin right angle	Top	Color-coded (red, white, and blue) POK lines from the power supply, to prevent excessive current draw by the disk drives during power-up.
2-pin right angle	Top	Reserved for future POK use.
10-pin Berg	Top	Multicolored ribbon cable from the backplane. This cable carries the DCOK, POK, +5 Vdc, and signal ground lines for the DC OK LED and disk activity lights.

1.7 Power Supply

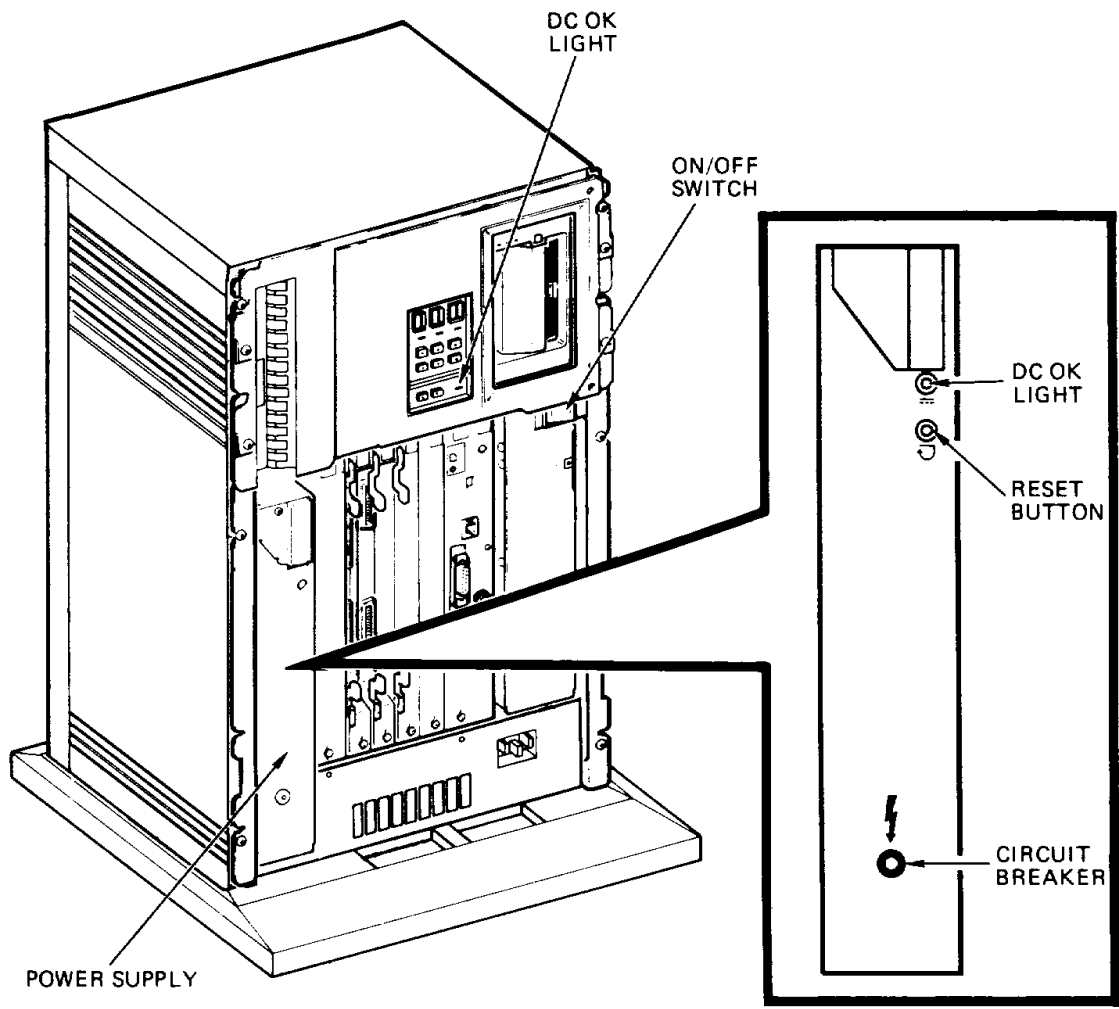
The BA215 enclosure contains one power supply, either H7868–A (120 Vac) or H7868–B (240 Vac), shown in Figure 1–12. The power supply plugs directly into the backplane via a 56-pin connector, and can deliver the following maximum currents:

- 7.6 amperes at +12 Vdc
- 33.0 amperes at +5 Vdc

The combined maximum currents at +5 Vdc and +12 Vdc must not consume more than 230 watts of power.

The power supply has an ac input power connector at its base, which connects to the 12-pin connector on the ac line filter assembly; only 6 of the 12 pins are used.

Figure 1-12: BA215 Power Supply



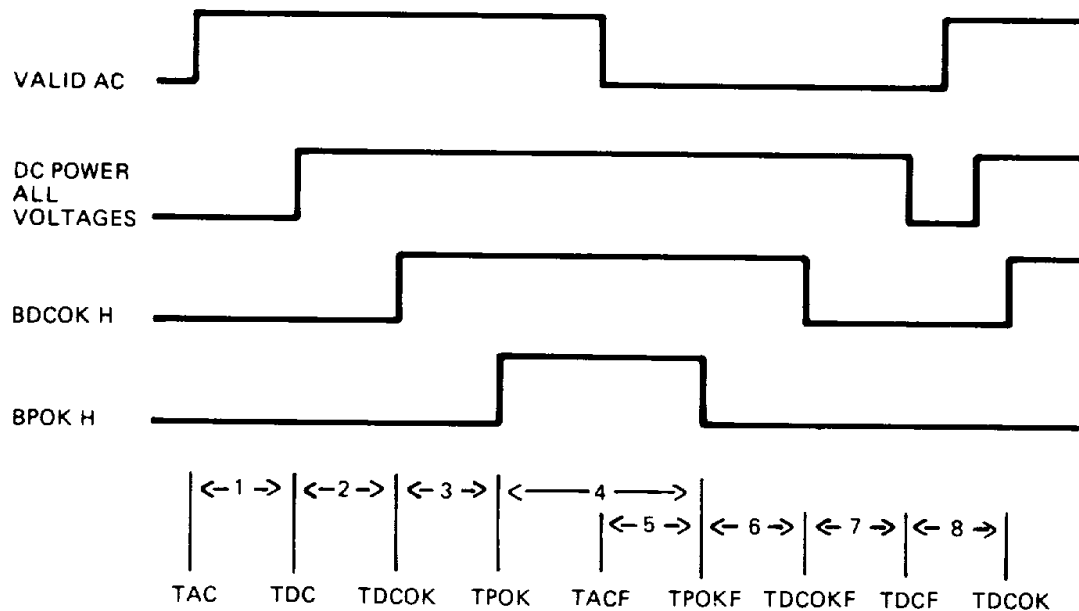
MLO-000778

The power supply enters and completes a shutdown sequence whenever the BPOK H signal is negated (Figure 1-13). When BPOK H is asserted high on the Q22-bus, the power system is in a state to allow normal system operation. The following conditions negate BPOK H:

- Temperature sensor triggered, possibly caused by fan failure
- An overcurrent condition
- Input voltage greater than 132 Vrms or less than 88 Vrms (at 120-Vac range)

The power supply ac and dc power controls and indicators are listed in Table 1-7. (See also Figure 1-12.)

Figure 1-13: BA215 Power Supply Timing Diagram



- | | |
|----------------------------------|------------------------------|
| 1. 3 seconds maximum | 5. 20 msec ride-through time |
| 2. 3 milliseconds (msec) minimum | 6. 4 msec minimum hold up |
| 3. 70 msec minimum | 7. 5 msec minimum |
| 4. 3 msec minimum | 8. 3 msec minimum |

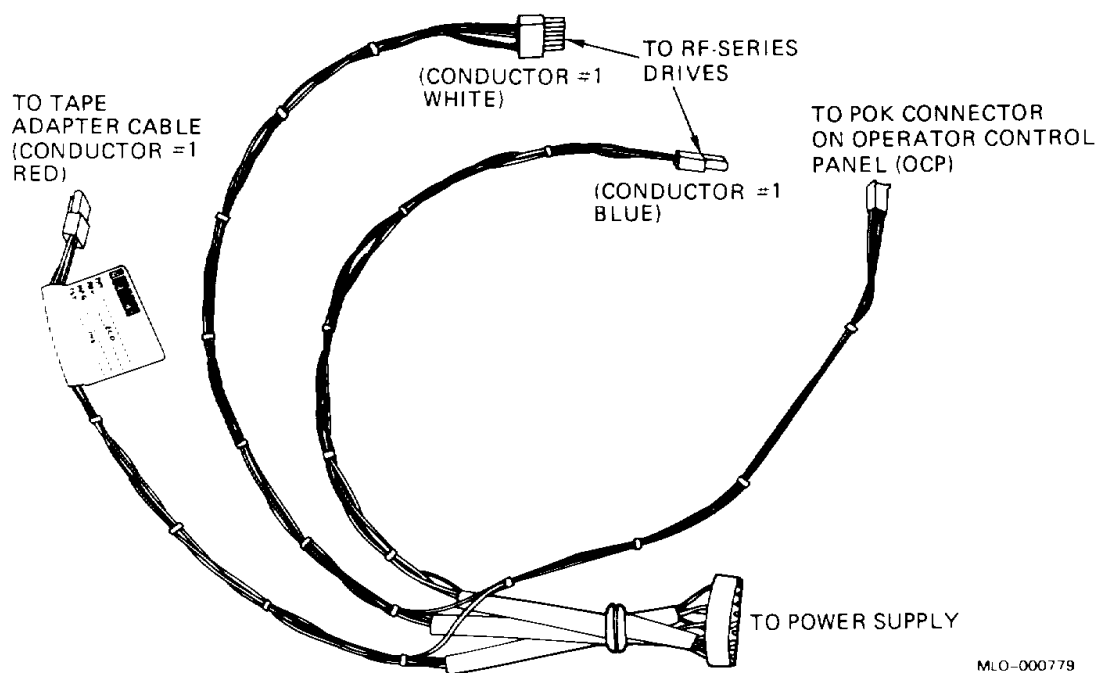
MLO-000129

Table 1–7: BA215 Power Supply Controls and Indicators

Indicator	Location	Function
AC power	On/off (I/O) power switch	Lights when the on/off switch is set to on (1), and the ac voltage is present at the input of the power supply.
DC OK	Front panel (OCP)	Lights when power supply output dc voltages are normal.
DC OK	Power supply front panel	Lights when power supply output dc voltages are normal.
Reset button	Power supply front panel	Resequences the power cycle for modules in the backplane.
Circuit breaker	Power supply front panel	Stops flow of current in an overload or stressed electric circuit.

Mass storage devices receive power through a nine-pin connector on the top front of the power supply. Figure 1–14 shows the DSSI power cable with connectors to RF-series drives and the OCP.

Figure 1–14: Power Supply Cable to DSSI Mass Storage Devices



The RF-series OCP contains a three-pin connector for POK lines (color coded) from the power supply (Figure 1–14). The POK signal is on all three lines, and is used to prevent excessive current draw by the disk drives during power-up. The OCP also contains a two-pin POK connector, reserved for future use.

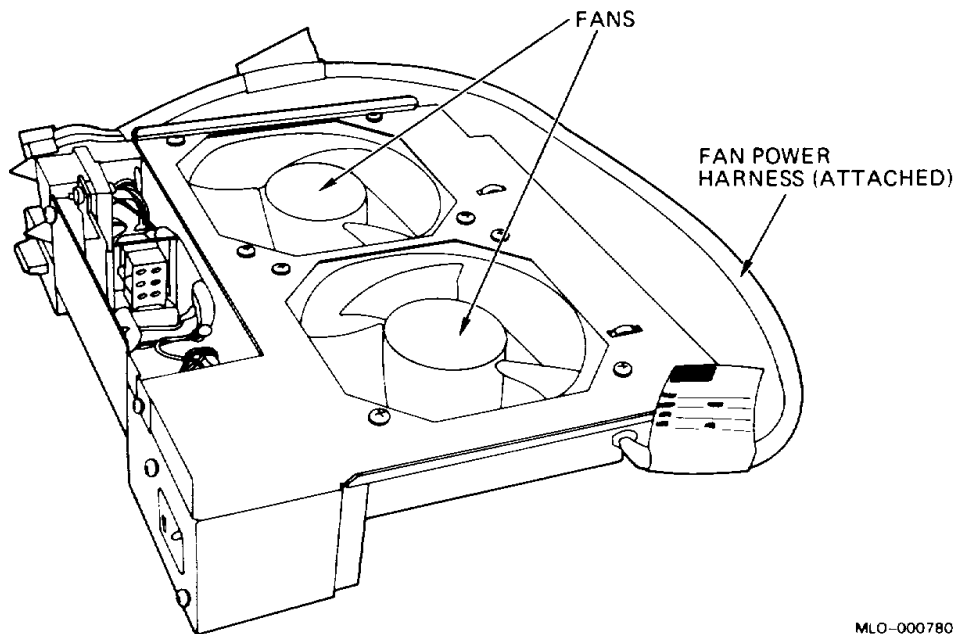
1.8 AC Line Filter and Fans

The BA215 enclosure has one ac line filter, located on the fan tray assembly. The fan tray assembly fits under the card cage, behind the safety plate, as shown in Figure 1–15. The fan tray assembly contains a 12-pin connector (only 6 of the 12 pins are used) to provide ac input power to the power supply, and a six-pin connector, which connects the on/off switch assembly to the power supply.

The fan tray assembly houses two 11.3-cm (4.5-in) dc fans (Figure 1–15). The fans draw air into the top of the enclosure. The air passes through the enclosure and exhausts through the bottom.

A temperature sensor in the power supply adjusts the fan speed by varying the input voltage based on the room temperature. The sensor adjusts input voltage to provide sufficient cooling, at minimum speed, for all combinations of load. The voltage to the fans varies from a maximum of –12.7 volts at 42°C (108°F) to a minimum of –7.8 volts at 30°C (86°F).

Figure 1–15: BA215 Fan Tray Assembly



MLO-000780

1.9 Configuration Guidelines

Before you change a configuration in the BA215 enclosure, you must consider the following factors:

- Module order in the backplane
- Module configuration

When you add a device to a system, you must know the capacity of the system enclosure in these areas:

- Number of backplane slots
- Power limitation

1.9.1 Module Order and Configuration

Module order in the backplane is system specific, depending on the CPU. Refer to the applicable CPU maintenance documentation for the preferred module order of the specific system.

For information on how to configure modules, refer to *Microsystems Options*, which includes a complete listing of all supported options along with the following information for each module and device:

- Ordering information
- Operating system support
- Diagnostic support
- Option description
- CSR addresses and interrupt vectors
- LEDs
- Loopback connectors
- Self-tests
- FRUs (if applicable)
- Related documentation

1.9.2 Configuration Worksheet

Use the configuration worksheet shown in Figure 1–16 to make sure a configuration does not exceed system limits for expansion space, power, and bus loads. If you use standard DIGITAL modules, you will not exceed the limits for bus loads.

When you change a configuration, use the worksheet as follows:

1. List all the devices already installed in the system.
2. List all the devices you plan to install in the system.
3. Fill in the information for each device, using the data listed in Table 1–8.
4. Add up the columns. Make sure the totals are within the limits for the power supply.

NOTE: Check the appropriate CPU maintenance documentation to determine which options are supported for the specific system.

Table 1–8: Power and Bus Load Data

Option	Module	Current (Amps)		Power	Bus Loads	
		+5 V	+12 V	Watts	AC	DC
AAV11-SA	A1009-PA	1.8	0.0	9.0	2.1	0.5
ADV11-SA	A1008-PA	3.2	0.0	16.0	2.3	0.5
AXV11-SA	A026-PA	2.0	0.0	10.0	1.2	0.3
KWV11-SA	M4002-PA	2.2	0.130	11.16	1.0	0.3
CXA16-M	M3118-YA	1.6	0.20	10.4	3.0	0.5
CXB16-M	M3118-YB	2.0	0.0	10.0	3.0	0.5
CXY08-M	M3119-YA	1.8	0.30	12.6	3.2	0.5
DELQA-SA	M7516-PA	2.7	0.5	19.5	2.2	0.5
DEQNA-SA	M7504-PA	3.5	0.50	23.5	2.2	0.5
DFA01	M3121-PA	1.97	0.40	14.7	3.0	1.0
DPV11-SA	M8020-PA	1.2	0.30	9.6	1.0	1.0
DRQ3B-SA	M7658-PA	4.5	0.0	22.5	2.0	1.0
DRV1J-SA	M8049-PA	1.8	0.0	9.0	2.0	1.0
DRV1W-SA	M7651-PA	1.8	0.0	9.0	2.0	1.0
DZQ11-SA	M3106-PA	1.0	0.36	9.3	1.4	0.5
IBQ01-SA	M3125-PA	5.0	0.0	25.0	4.6	1.0
IEQ11-SA	M8634-PA	3.5	0.0	17.5	2.0	1.0
KA620-AA	M7478	6.2	0.14	32.7	2.7	1.0
KA630-AA	M7606	6.2	0.14	32.7	2.7	1.0
KA640-AA	M7624	6.0	0.14	31.68	3.5	1.0
KA650-AA	M7620-A	6.0	0.14	31.7	2.7	1.0
KDJ11-BC	M8190	5.5	0.1	28.7	2.3	1.1
KDJ11-BF	M8190	5.5	0.2	29.9	2.6	1.0
KMV1A-SA	M7500-PA	2.6	0.2	15.4	3.0	1.0
KWV11-SA	M4002-PA	2.2	0.13	11.16	1.0	0.3
LPV11-SA	M8086-PA	1.6	0.0	8.0	1.8	0.5
M9060	M9060-YA	5.3	0.0	26.5	0.0	0.0
MS630-AA	M7607	1.0	0.0	5.0	0.0	0.0
MS630-BA	M7608	1.8	0.0	9.0	0.0	0.0
MS630-BB	M7608	1.8	0.0	9.0	–	–
MS630-CA	M7609	3.1	0.0	15.5	0.0	0.0
MS650-AA	M7621-A	2.7	0.0	13.5	0.0	0.0
MSV11-JD	M8637-D	3.74	0.0	18.7	2.7	0.5
MSV11-JE	M8637-E	4.1	0.0	20.5	2.7	0.5

Table 1–8 (Cont.): Power and Bus Load Data

Option	Module	Current (Amps)		Power Watts	Bus Loads	
		+5 V	+12 V		AC	DC
MSV11-PK	M8067-K	3.45	–	17.25	2.0	1.0
MSV11-PL	M8067-L	3.6	–	17.5	2.0	1.0
MSV11-QA	M7551-AA	2.4	0.0	12.0	2.0	1.0
RF30-S	–	1.25	2.85	18.3	–	–
TK50	–	1.35	2.4	33.55	–	–
TQK50	M7546	2.9	0.0	14.5	2.0	1.0
VCB02	M7169	5.8	0.75	38.0	3.5	1.0
VCB02	M7168	3.4	0.0	17.0	0.0	0.0

Figure 1–16: BA215 Configuration Worksheet

POWER SUPPLY					BACKPLANE	
SLOT	MODULE	Current (Amps)		Power (Watts)	Bus Loads	
		+5 Vdc	+12 Vdc		AC	DC
1						
2						
3						
4						
5						
6						
MASS STORAGE:						
TAPE					—	—
DISK 1					—	—
DISK 2					—	—
DSSI Terminator		0.64	0.0	3.0	—	—
Total all columns:						
Must NOT exceed:		33.0 A	7.6 A *	230.0 W	33.5* *	20.0

*NOTE: Power supplies may differ. Check your power supply specifications to confirm the maximum +12V current.

** Applicable to KA6xx-series CPUs.

ML0-000781

Chapter 2

Installation

2.1 Introduction

This chapter provides site preparation guidelines and installation procedures for the BA215 enclosure in an office pedestal.

2.2 Site Preparation

Before you unpack the BA215 enclosure shipment, verify the site preparations in this section.

2.2.1 Clearance Requirements

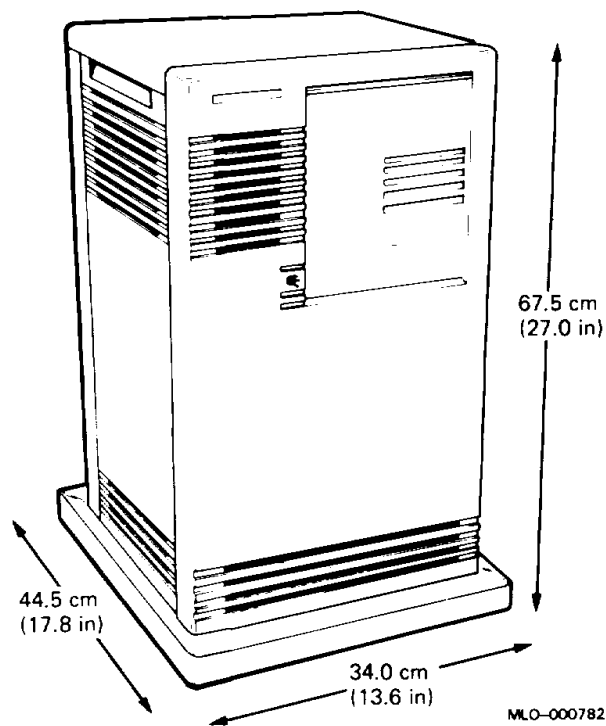
Figure 2–1 shows the dimensions of a BA215 enclosure in an office pedestal.

You must leave at least 100 cm (40 in) of clearance in front of the enclosure, to ensure access to system controls. You can place the rear of the enclosure against a wall or table, and the system will have enough room for adequate airflow because the base of the enclosure is 5 cm (2 in) wider than the cabinet.

If you are placing the enclosure alongside other equipment, you must leave at least 30 cm (12 in) of clearance at each side for proper airflow. If other equipment will not be next to the enclosure, leave at least 5 cm (2 in) of clearance at each side for proper airflow.

WARNING: *Use two people to handle the BA215 shipping carton and enclosure. The system weighs between 50 kg (110 lb) and 64 kg (140 lb), depending on the options installed.*

Figure 2–1: BA215 Pedestal Dimensions



2.2.2 Acoustics

The BA215 enclosure in a pedestal is designed for use in offices and other general working areas.

The acoustic emission levels are as follows:

- LNPE for the BA215 enclosure is 5.7. LNPE (B) is the noise power emission level (A_weighted sound power level) measured in bels re 1 pw (reference 1 picowatt).
- LPA for the BA215 enclosure is 38. LPA is the sound pressure measured in decibels at 1.0 m (3.3 ft) from the front edge of the unit and 1.5 m (5.0 ft) above the floor.

NOTE: *Levels may be lower, depending on the kind and number of mass storage devices in the system. Data is measured in accordance with ANSI S12.10–1985 (American National Standards Institute) and ISO/DIS 7779 (International Standards Organization).*

2–2 BA215 Enclosure Maintenance

2.2.3 Heat Dissipation

Heat dissipates in the BA215 enclosure system at a maximum rate of 1178 Btu per hour.

2.2.4 Electrical Requirements

Table 2–1 lists the electrical requirements for systems in the BA215 pedestal. Table 2–2 lists international power cords.

Table 2–1: BA215 Electrical Requirements

Nominal AC Voltage ⇒	101 Vac	120 Vac	220–240 Vac
Voltage range	88 to 110 Vac	93 to 132 Vac	176 to 264 Vac
Power source phase	Single	Single	Single
Nominal frequency	50 to 60 Hz	50 to 60 Hz	50 to 60 Hz
Frequency range	47 to 63 Hz	47 to 63 Hz	47 to 63 Hz
Maximum steady state current at nominal voltage	5.2 A	4.4 A	2.4 A
Minimum steady state current at nominal voltage	0.87 A	0.73 A	0.40 A
Start-up current (30 seconds)	7.1 A	5.9 A	3.1 A
Maximum inrush current	50 A	50 A	50 A
Maximum power consumption	340 W	340 W	340 W

Table 2–2: 240 Vac Power Cords

Description	Option	Part number
United States, 120 Vac	BN20M–2E	17–00083–11
United States, Japan, 240 Vac	BN20N–2E	17–00083–12
Australia, New Zealand, 240 Vac	BN19J–2E	17–00198–08
Europe-Schuko, 240 Vac	BN03B–2E	17–00199–01
United Kingdom, Ireland, 240 Vac	BN19B–2E	17–00209–09
Switzerland, 240 Vac	BN19F–2E	17–00210–06
Denmark, 240 Vac	BN19L–2E	17–00310–06
Italy, 240 Vac	BN19N–2E	17–00364–09
South Africa, India, 240 Vac	BN19T–2E	17–00456–09
Israel, 240 Vac	BN19Y–2E	17–00457–09

2.3 Unpacking the Shipment

Unpack the BA215 enclosure shipment as follows:

1. Check the invoice to make sure the shipment is complete. The shipment contains several cartons:
 - One carton contains the BA215 enclosure. A wooden pallet is attached to the bottom of this carton.
 - One carton contains cables for connecting additional devices to the system.
 - Several cartons contain console terminal components.
 - One carton, marked "software," contains software documentation, system software, diagnostic software, and a software license.

NOTE: *Save all packing materials in case the system needs to be reshipped in the future.*

Depending on the customer's order, the shipment may also include additional terminals, printers, or modems.

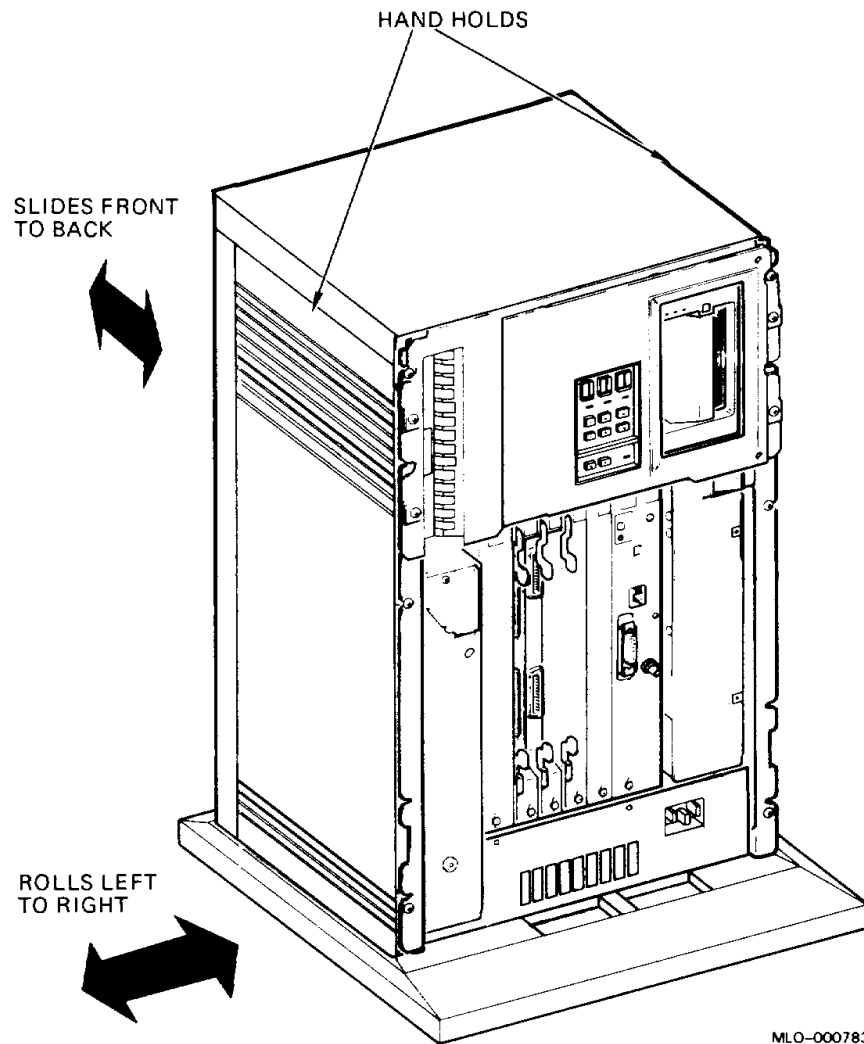
2. Before unpacking the equipment, check the cartons for external shipping damage. Report any damage to the Field Service or sales office and to the local carrier.
3. Unpack the BA215 enclosure according to the instructions on the carton with the wooden pallet attached.

WARNING: *Use two people to lift the system. The system weighs between 50 kg (110 lb) and 64 kg (140 lb), depending on the options installed.*

4. Verify that the system power requirements match the power source. The correct voltage for the system is listed on the serial number label next to the power supply. If the voltage does not match the power source, do not continue; contact the salesoffice.
5. Unpack the remaining cartons. Check the contents against the shipping list to make sure the order is complete.

6. Move the BA215 enclosure to the desired location. Casters attached to the base of the BA215 enclosure allow you to easily push it into place and position it (Figure 2-2). Leave a few inches behind the BA215 enclosure for routing cables underneath. When you have completed the installation, you can place the enclosure base directly against a wall.

Figure 2-2: Sliding the BA215 Enclosure into Place



7. You must release the four brackets that hold the mass storage devices during shipping. There are four orange plain-slotted screws that hold the shipping brackets, two on each side of the mass storage area. Using the instructions on the BA215 enclosure carton, loosen these four screws about five or six turns, or until you hear the shipping brackets release. Then firmly tighten them again. Loosening the shipping bracket screws automatically releases the shipping brackets on the inside of the mass storage area.

CAUTION: *Failure to release the shipping brackets may result in damage to the disk drives.*

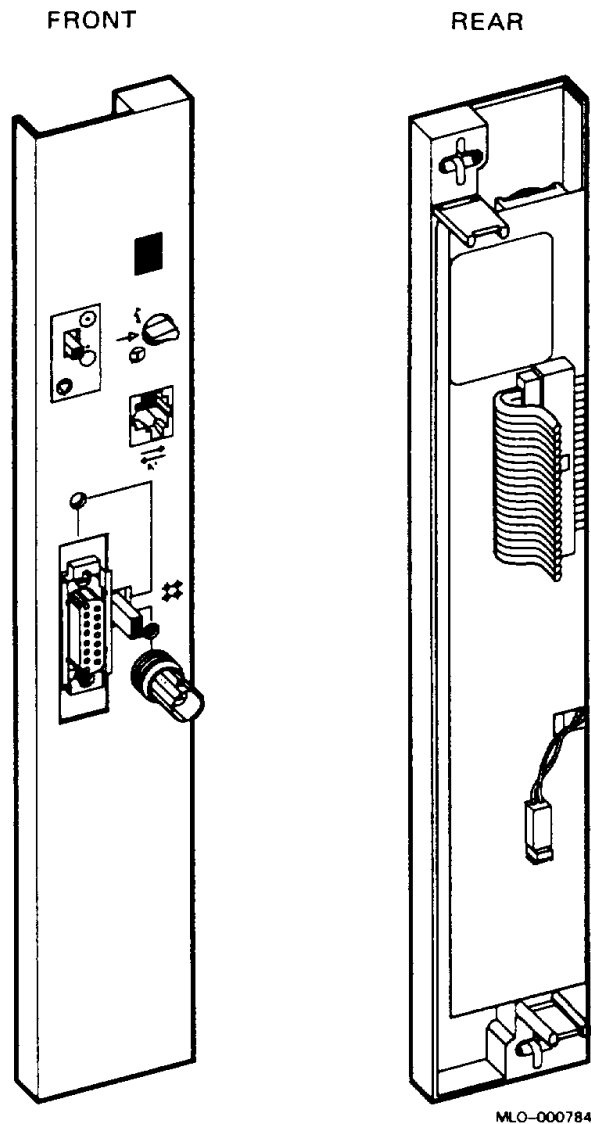
After the shipping brackets are released, you must tighten the screws firmly to allow for front panel clearance.

2.4 Connecting Devices

Connect the console terminal and additional devices as follows:

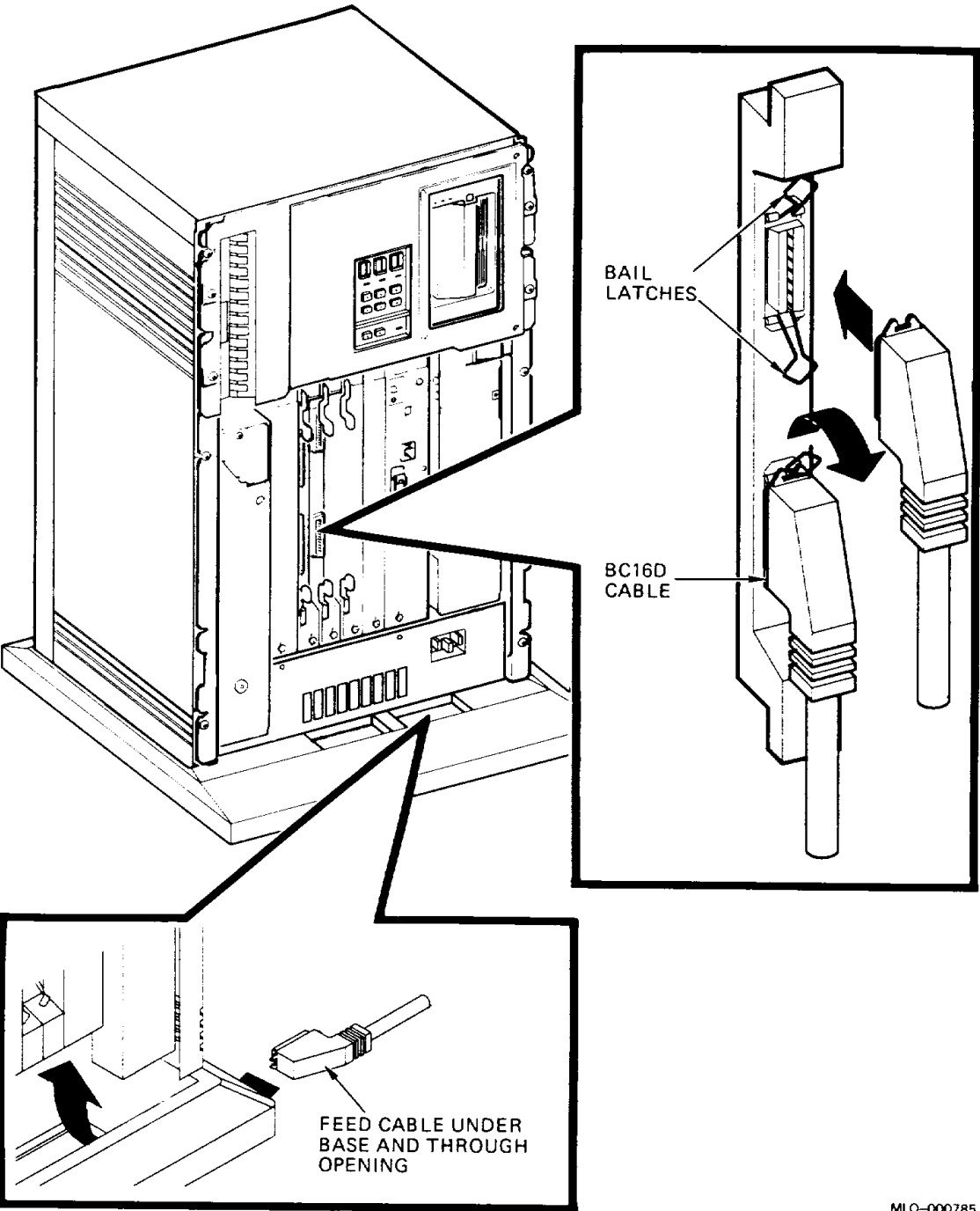
1. Install the console terminal according to the instructions in the installation guide for the terminal. The CPU connects to the console terminal through a CPU I/O panel, such as the H3602-SA (KA640 CPU) (Figure 2-3).

Figure 2-3: H3602-SA I/O Panel (Example)



2. Connect cables for external devices directly to connectors on the module handles. Begin with the module on the right, then continue toward the left. Each module handle or cover has a label at the top that contains the option and module number. Figure 2-4 shows the CXA16 module connections.
3. Refer to the customer documentation for instructions on connecting peripheral devices to system-specific modules installed in the BA215 enclosure.

Figure 2-4: Cable Connections, CXA16 Module (Example)



MLO-000785

2.5 Setting System Controls

The system controls are located on the dual-width CPU I/O panel. These controls vary depending on the CPU.

For most systems, you must set the baud rate of the console serial line to the same baud rate as the console terminal, and make sure the fixed-disk drives are ready and not write-protected. Some systems also require you to set the enable/disable and power-up mode switches.

Using the removal procedure in Section 3.4.3, remove the CPU I/O panel. Check the appropriate CPU maintenance documentation for the correct switch settings, then set the system controls.

2.6 Connecting the Power Cord

Connect the power cord to the BA215 enclosure as follows:

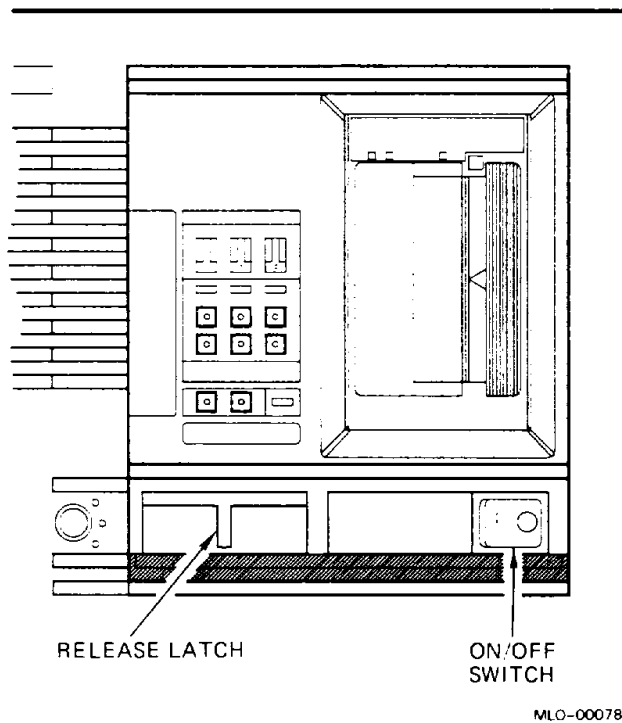
1. Make sure the system on/off switch is off (0).
2. Thread the power cord under the rear of the enclosure. The power cord receptacle is located at the front of the system to the right, just above the base of the enclosure. Plug the power cord into the power receptacle.
3. See the appropriate CPU maintenance documentation for information on the power-up self-tests and how to select a console terminal language.

2.7 Attaching the Front Panel

The front panel is packed separately in the BA215 enclosure shipping carton. Attach the front panel to the BA215 enclosure as follows:

1. Pull out on the release latch on the front panel (Figure 2-5), but do not attempt to remove it.

Figure 2–5: BA215 Front Panel Release Latch



2. Holding the front panel with both hands, place it against the front of the enclosure, about an inch above the bottom of the enclosure.
3. Slide the front panel down until you feel it lock into place. Secure the front panel by pushing in the release latch.

Chapter 3

FRU Removal and Replacement

3.1 Introduction

This chapter describes how to remove and replace the major field replaceable units (FRUs) for the BA215 enclosure.

3.2 List of BA215 Enclosure FRUs

Table 3–1 lists the BA215 enclosure FRUs and their part numbers.

CAUTION:

- *Only qualified service personnel should remove or replace FRUs.*
- *Before you remove or replace FRUs, always set the on/off power switch to off (0) and remove the ac power cord from the wall outlet.*
- *Static electricity can damage integrated circuits. Always use the grounded wrist strap and antistatic mat found in the Antistatic Kit (29–26246) when you work with the internal parts of a computer system.*

Table 3–1: BA215 Enclosure FRUs

FRU	Part Number
AC on/off switch and cable assembly	17-01938-01
Backplane	70-25447-01
Cable, backplane to OCP	17-01964-01
CD support panel (for dual-height modules)	74-33507-01
Cover, single-width	70-23981-01
Cover, dual-width	70-23982-02
Fans (dc), tray, and fan tray assembly	70-25454-01
Fans (2)	12-23609-04
Power cord (120 Vac, USA)	17-00083-11
Power supply, 120 Vac	H7868-A
Power supply, 240 Vac	H7868-B
Sidewall filler panel (for blank cover)	70-24505-01
Terminator, external DSSI	12-29258-01

NOTE: *The DSSI system expansion cable (BC21M) is packaged and supplied with the storage expander products.*

Table 3–2 lists the system-specific FRUs in the BA215 enclosure; their presence depends on which CPU and mass storage devices are installed. Refer to the applicable CPU maintenance documentation for a complete list of supported options; these options are also FRUs.

Table 3–2: System-Specific BA215 FRUs

FRU	Part Number
CPU I/O panel for KA640 CPU (H3602-SA)	70-25775-01
Operator Control Panel (OCP), RF-series drives	70-25453-01
Cable, KA640 to DSSI (round)	17-01963-01
Cable, RF-series disk to DSSI (flat)	17-01962-01
Cable, power supply to mass storage	17-01965-01
Cable, KA640 memory interconnect	17-01534-02
Cable, KA640 memory interconnect (3-conductor)	17-01534-01
Cable, KA640 memory interconnect (5-conductor)	17-01534-03
Cable, RF-series drive to OCP (10-conductor)	17-01936-01
Cable, TK power adapter	17-01937-01

3–2 BA215 Enclosure Maintenance

Table 3–3 lists the shock-mounting hardware and part numbers required to install RF30 disk drives and a TK50 tape drive in the BA215 enclosure. Each drive listed in the left column requires all the mounting hardware listed in the same row. One sliding track attaches to each side of the drive. One shock-resistant support attaches to the top of the mass storage area of the enclosure and one attaches to the bottom of the mass storage area.

Table 3–3: BA215 Shock-Mounting Hardware

Device	Left of Drive ¹	Right of Drive	Top of Enclosure	Bottom of Enclosure
RF30	74–36498–01	74–36498–01	70–25452–01	74–25452–01
TK50	74–33573–01	74–33573–02	70–23997–01	70–23997–02

¹Drive right side up and facing forward.

3.3 Accessing FRUs

Before you can remove FRUs from the BA215 enclosure, you must perform one or more of the procedures in this section:

- Remove the front panel.
- Remove the media faceplate covering the mass storage area.
- Remove the safety plate covering the fan tray assembly.
- Remove the side and top panels (one unit).

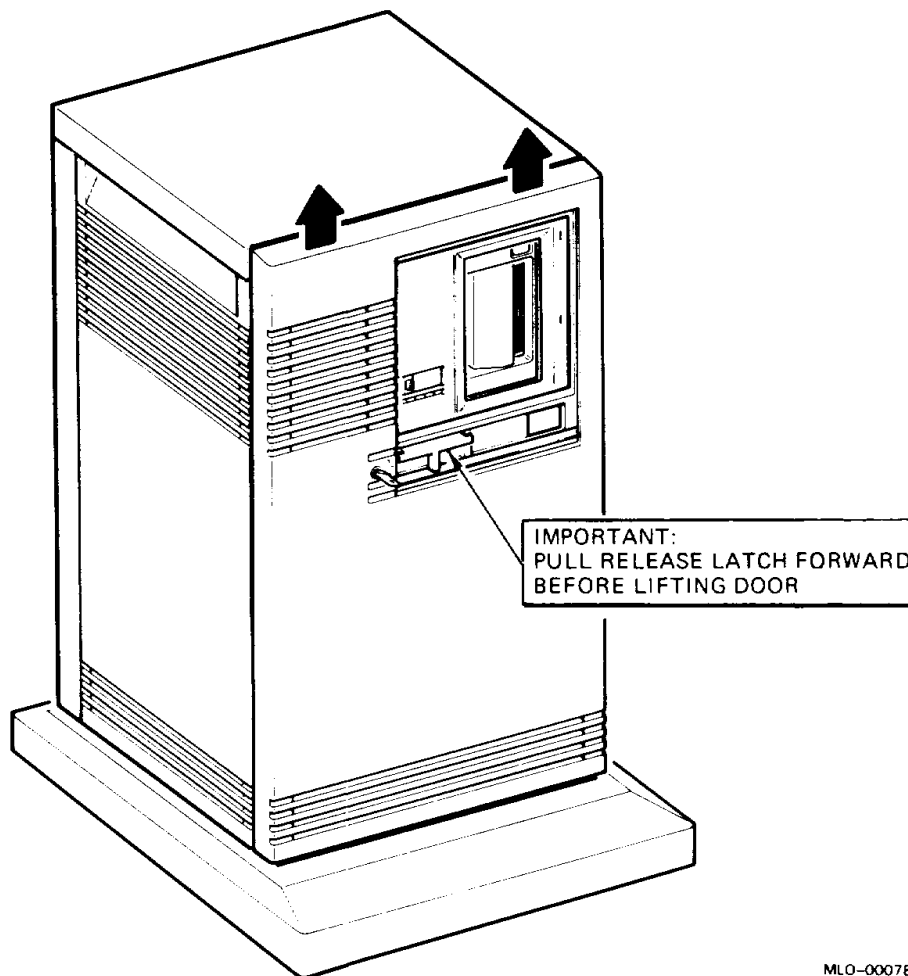
3.3.1 Removing the Front Panel

You must remove the front panel before removing any FRUs.

Remove the front panel as follows:

1. To reach the on/off power switch, turn the universal key in the front panel lock to the bottom position and lower the grey window.
2. Set the on/off power switch to off (0), and unplug the ac power cord from the wall outlet.
3. Pull the release latch toward you, but do not attempt to remove it (Figure 3–1).
4. Using the release latch as a handle, lift the front panel off (Figure 3–1).

Figure 3–1: Removing the BA215 Front Panel (Pedestal)



MLO-000787

3.3.2 Removing the Media Faceplate

You must remove the media faceplate before you can remove a disk drive, tape drive, operator control panel (OCP), or the ac on/off switch assembly.

Remove the media faceplate as follows:

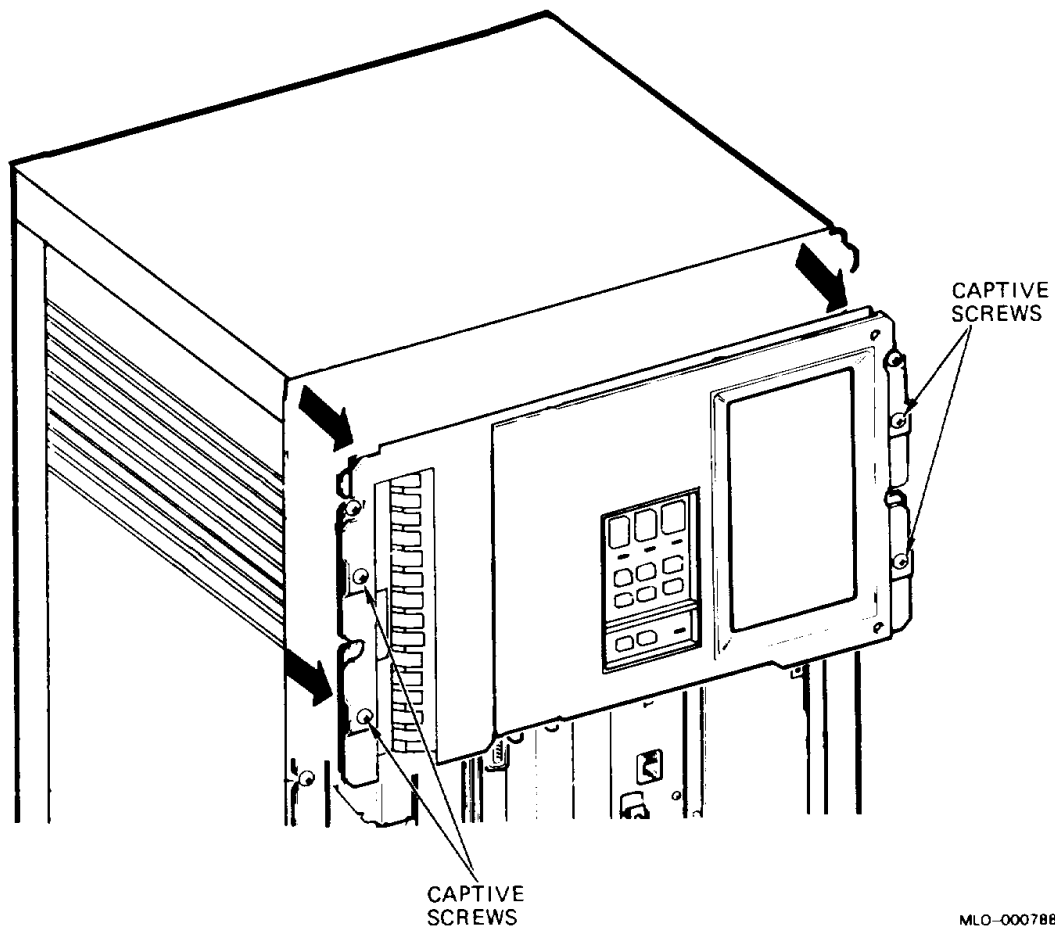
CAUTION: *Static electricity can damage integrated circuits. Use an antistatic wrist strap and mat when you remove the media faceplate.*

1. Remove the front panel, using the procedure in Section 3.3.1.
2. Put on the grounded wrist strap included in the Antistatic Kit (29-26246), and attach the alligator clip to the BA215 frame.
3. If installed, you must remove the DSSI expansion cable (BC21M) from the external device connector. Halt any bus activity on a second host system, then remove the DSSI expansion cable.

CAUTION: *Make sure you stop any bus activity before you remove the DSSI expansion cable, to prevent the possibility of high error rates.*

4. Loosen the four quarter-turn captive screws that hold the media faceplate to the BA215 frame (Figure 3-2). Remove the faceplate.

Figure 3-2: Removing the Media Faceplate



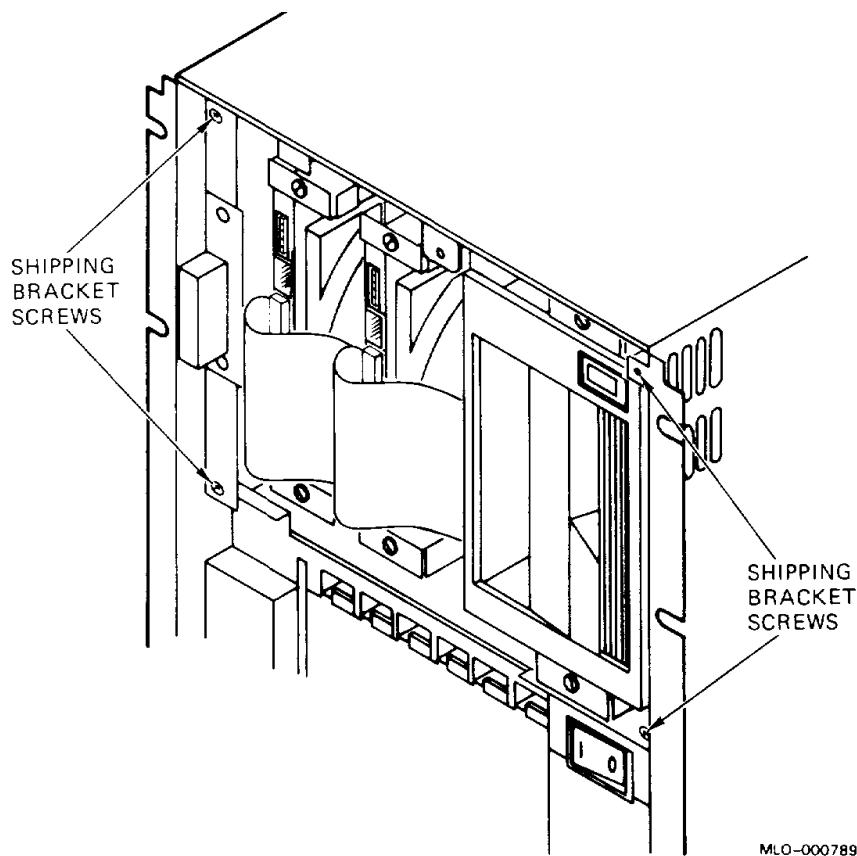
MLO-000788

5. The shipping brackets inside the mass storage area should already be in their released positions. To prevent damage to the disk drives, make sure the shipping brackets are released by loosening the four orange plain-slotted screws, shown in Figure 3-3, about five or six turns. Then firmly tighten them again. Loosening the shipping bracket screws automatically releases the shipping brackets.

CAUTION: *Failure to release the shipping brackets may result in damage to the disk drives.*

After the shipping brackets are released, you must firmly tighten the shipping bracket screws again to allow for front panel clearance.

Figure 3-3: BA215 Shipping Bracket Screws



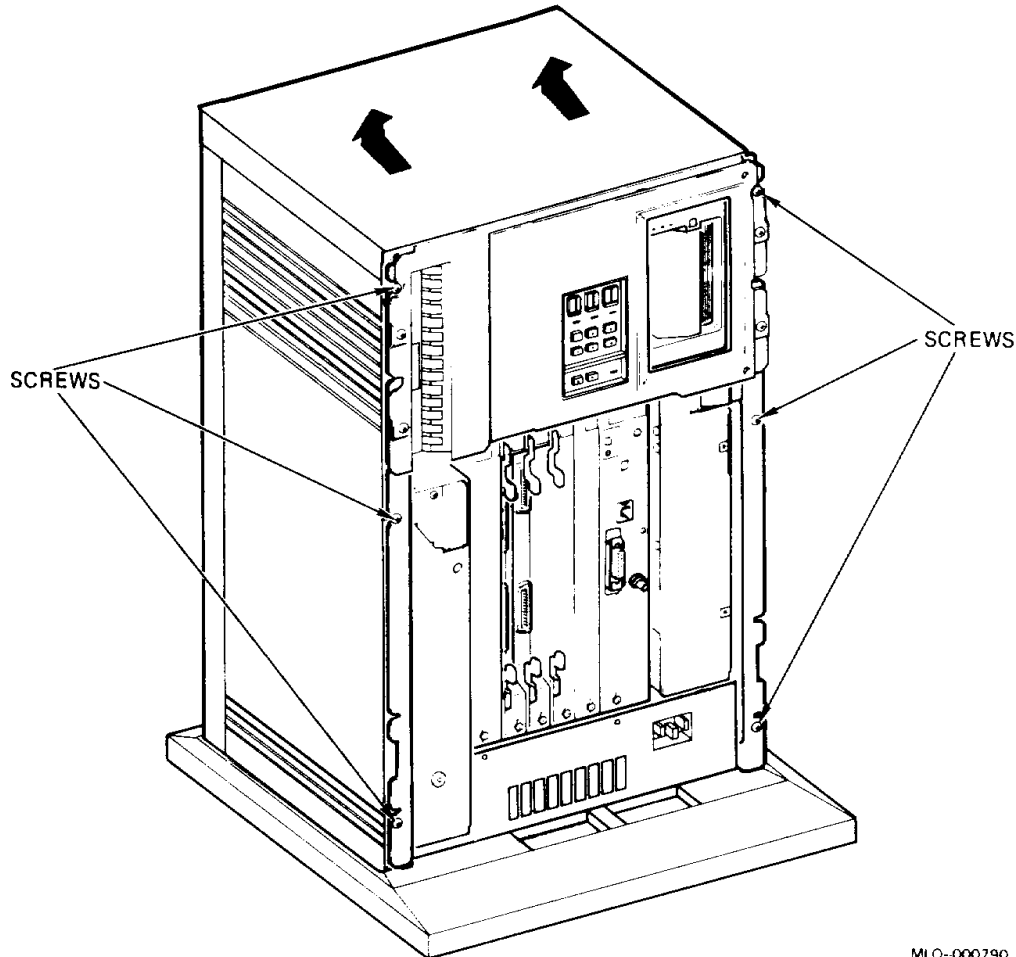
3.3.3 Removing the Side and Top Panel Unit

You must remove the side and top panel unit before you can remove the backplane.

Remove the side and top panel unit as follows:

1. Remove the media faceplate, using the procedure in Section 3.3.2.
2. Remove the six Phillips-head screws with metal washers, three on each side of the BA215 frame, that hold the side and top panel unit to the BA215 frame (Figure 3–4).
3. The side and top panel unit is seated to the top of the BA215 frame by four shoulder bolts. Slide the side and top panel unit toward the rear of the BA215 frame, to unseat the shoulder bolts from the keyhole slots on the BA215 frame. Lift the side and top panel unit and remove.

Figure 3-4: Removing the BA215 Side and Top Panel Unit



MLO-000790

3.3.4 Removing the Safety Plate

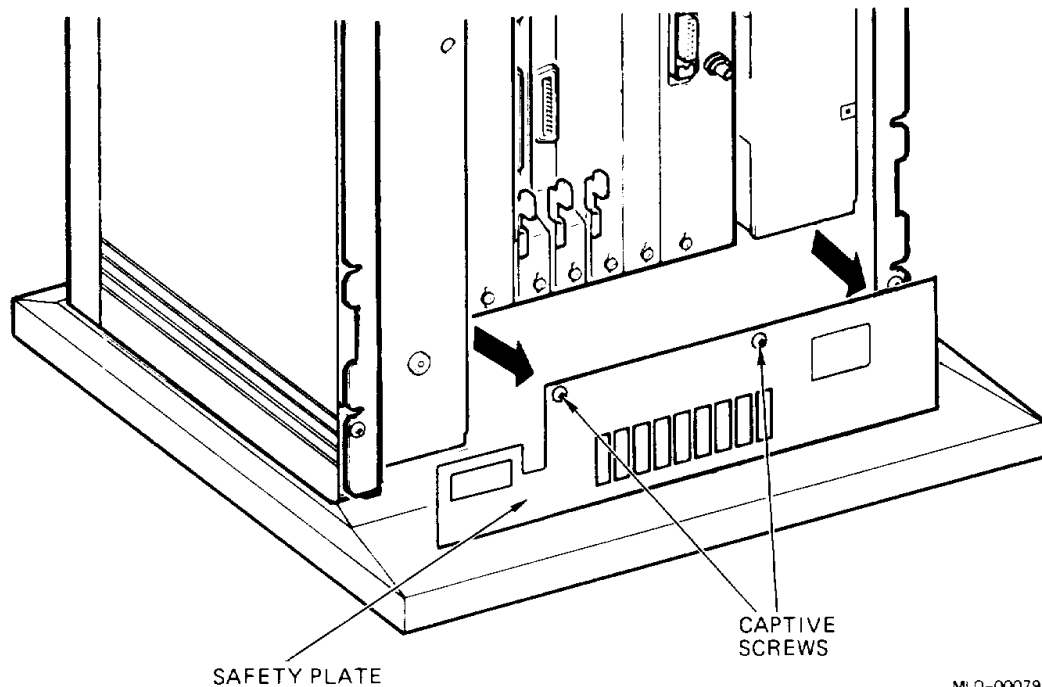
You must remove the safety plate covering the fan tray assembly before you can remove the fan tray assembly, the power supply, and the on/off switch assembly.

Remove the safety plate as follows:

1. Remove the front panel, using the procedure in Section 3.3.1.
2. Put on the grounded wrist strap included in the Antistatic Kit (29-26246), and attach the alligator clip to the BA215 frame.

3. Loosen the two Phillips-head captive screws at the top of the safety plate (Figure 3-5).
4. The bottom edge of the safety plate sits behind a rolled lip at the bottom of the BA215 frame. Dislodge the safety plate from the rolled lip, and remove.

Figure 3-5: Removing the Safety Plate



MLO-000791

3.4 Removal Procedures for BA215 Enclosure FRUs

Each of the following sections describes the removal procedure for the specified FRU. Unless otherwise indicated, you can replace an FRU by reversing the steps in the removal procedure.

3.4.1 Modules with Bulkhead Handles

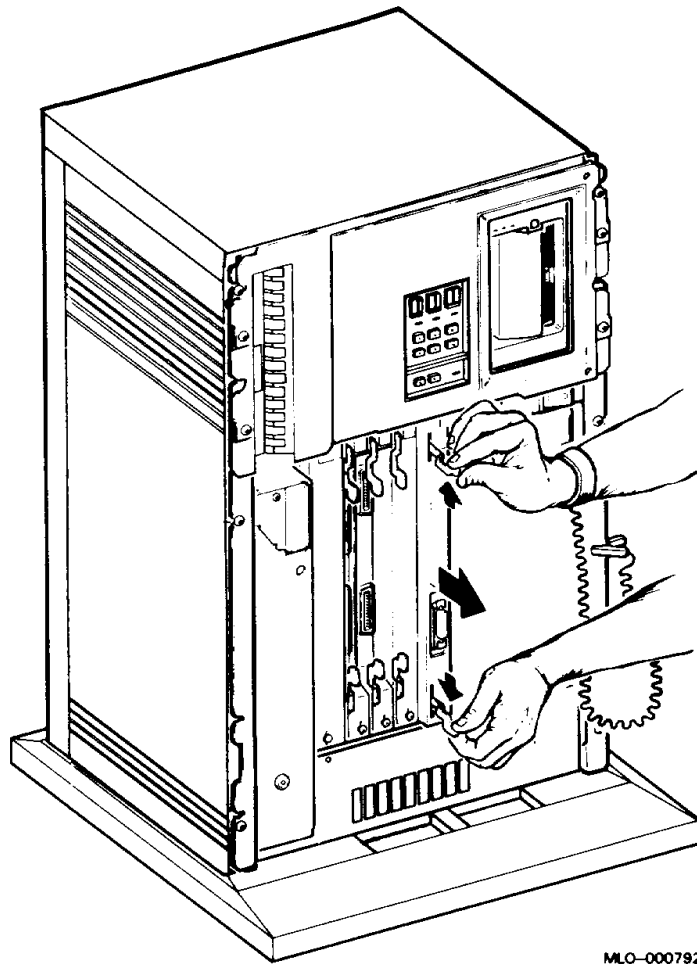
The BA215 enclosure uses modules with attached bulkhead handles or with covers. See Section 1.2 for a complete description of BA200-series handles and covers.

Remove modules with bulkhead handles as follows:

CAUTION: *Static electricity can damage integrated circuits. Use an antistatic wrist strap and mat when you remove or replace modules.*

1. Remove the front panel, using the procedure in Section 3.3.1.
2. Put on the grounded wrist strap included in the Antistatic Kit (29–26246), and attach the alligator clip to the BA215 frame.
3. Note the orientation of external cables connected to the module. Label and disconnect the cables.
4. Release the two quarter-turn captive screws that hold the module handle to the card cage.
5. Unlock the release levers by simultaneously pulling up on the top lever and pulling down on the bottom lever (Figure 3–6).
6. Pull out on the module's handle, and remove the module from the card cage.

Figure 3-6: Unlocking the Release Levers



MLO-000792

Installation Note

When you install a module that has either a blank cover or a flush handle next to a module with a recessed handle, you *must* install a filler panel (70-24505-01) between the modules to meet regulations for electromagnetic interference (EMI). Without the filler panel, circuitry on the module with a recessed handle is exposed.

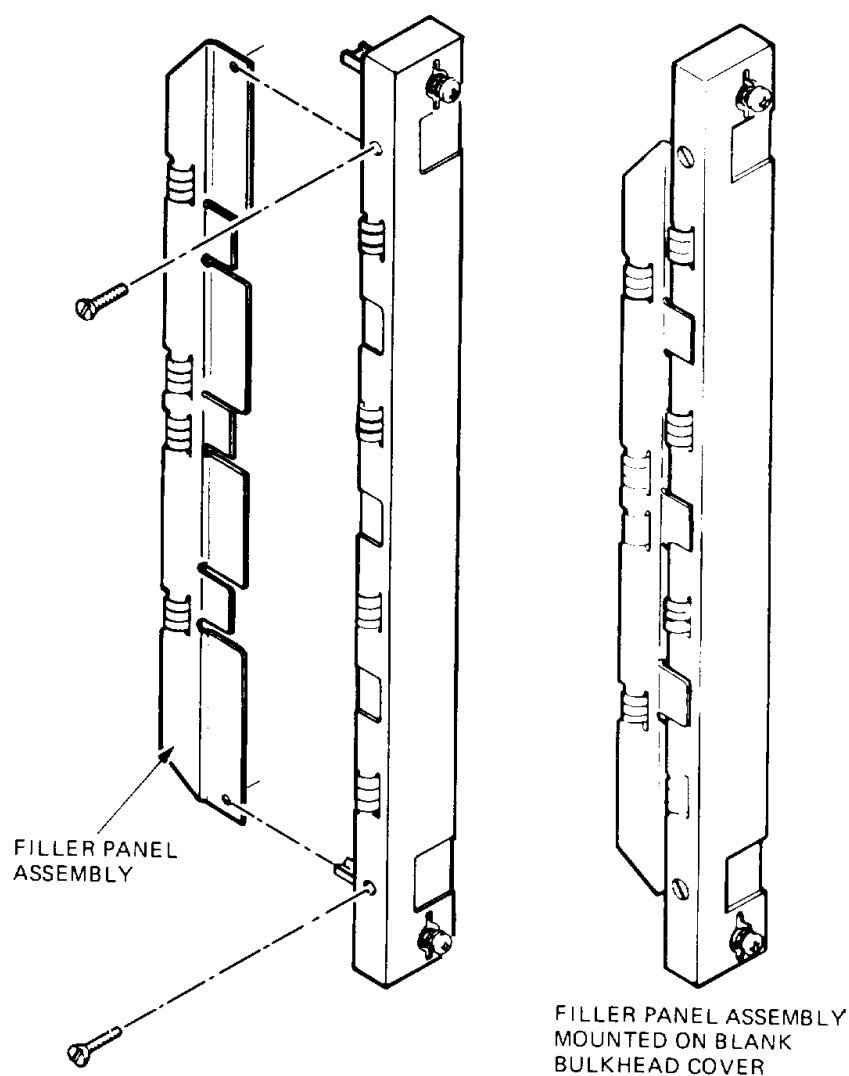
Check the modules in the card cage to see if any module with a recessed handle is next to a module with a blank cover or a flush handle. Install the filler panel, if needed, as follows:

1. Fit the filler panel onto the side of the blank cover or flush-handle module that is next to the module with the recessed handle. Make sure

the tabs on the filler panel fit into the tab indentations on the blank cover or flush handle (Figure 3-7).

2. Using the two screws that come with the filler panel, attach the filler panel to the top and bottom of the blank cover or flush handle (Figure 3-7).

Figure 3-7: Attaching the Filler Panel (Example)



MLO-000793

3.4.2 Modules with Covers

The BA215 enclosure uses modules with attached bulkhead handles or with covers. See Section 1.2 for a complete description of BA200-series handles and covers.

Remove modules with covers as follows:

CAUTION: *Static electricity can damage integrated circuits. Use an antistatic wrist strap and mat when you remove or replace modules.*

1. Remove the front panel, using the procedure in Section 3.3.1.
2. Put on the grounded wrist strap included in the Antistatic Kit (29–26246), and attach the alligator clip to the BA215 frame.
3. Release the two quarter-turn captive screws that hold the cover to the card cage.
4. Pull the cover away from the card cage.
5. Note the orientation of internal cables connected to the module. Some connectors are not keyed. Label and disconnect the cables.
6. Unlock the module's release levers by simultaneously pulling up on the top lever and pulling down on the bottom lever. For a module with a plastic handle, pull out on the plastic handle.
7. Carefully pull the module out of the card cage.

Installation Note

Check to see if you need a filler panel(s) according to the procedure in the Installation Note, Section 3.4.1.

3.4.3 CPU I/O Panel

The CPU connects to the console terminal through a CPU I/O panel, described in Section 2.4.

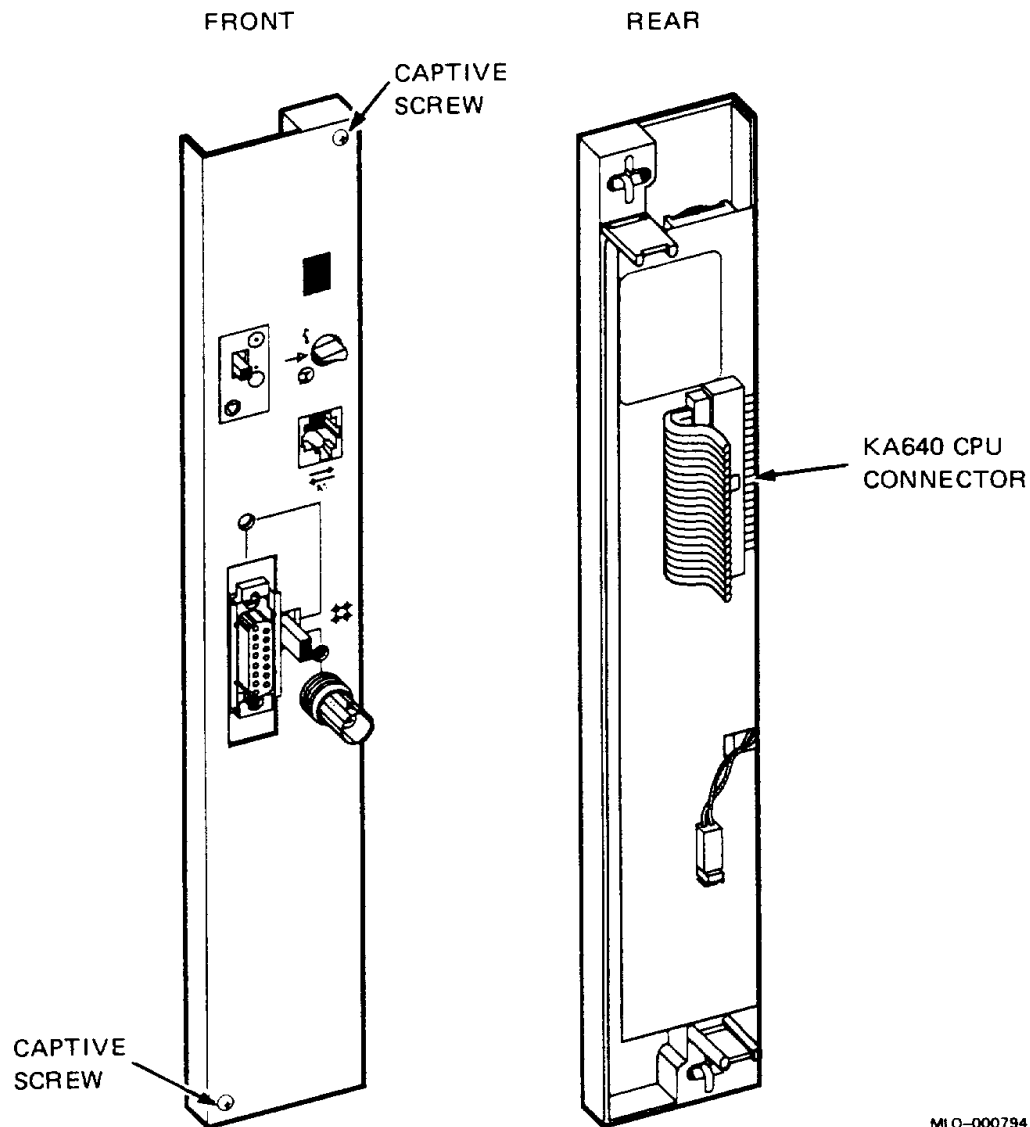
Remove the CPU I/O panel covering the CPU module in slot 1 in the card cage, as follows:

CAUTION: *Static electricity can damage integrated circuits. Use an antistatic wrist strap and mat when you remove or replace modules.*

1. Remove the front panel, using the procedure in Section 3.3.1.
2. Put on the grounded wrist strap included in the Antistatic Kit (29–26246), and attach the alligator clip to the BA215 frame.

3. Release the two quarter-turn captive screws that hold the CPU I/O panel to the card cage (Figure 3-8).
4. Pull the CPU I/O panel away from the card cage, and disconnect the keyed ribbon cable from the rear of the panel (Figure 3-8).

Figure 3-8: H3602-SA I/O Panel (Example)



MLO-000794

3.4.4 Operator Control Panel (OCP)

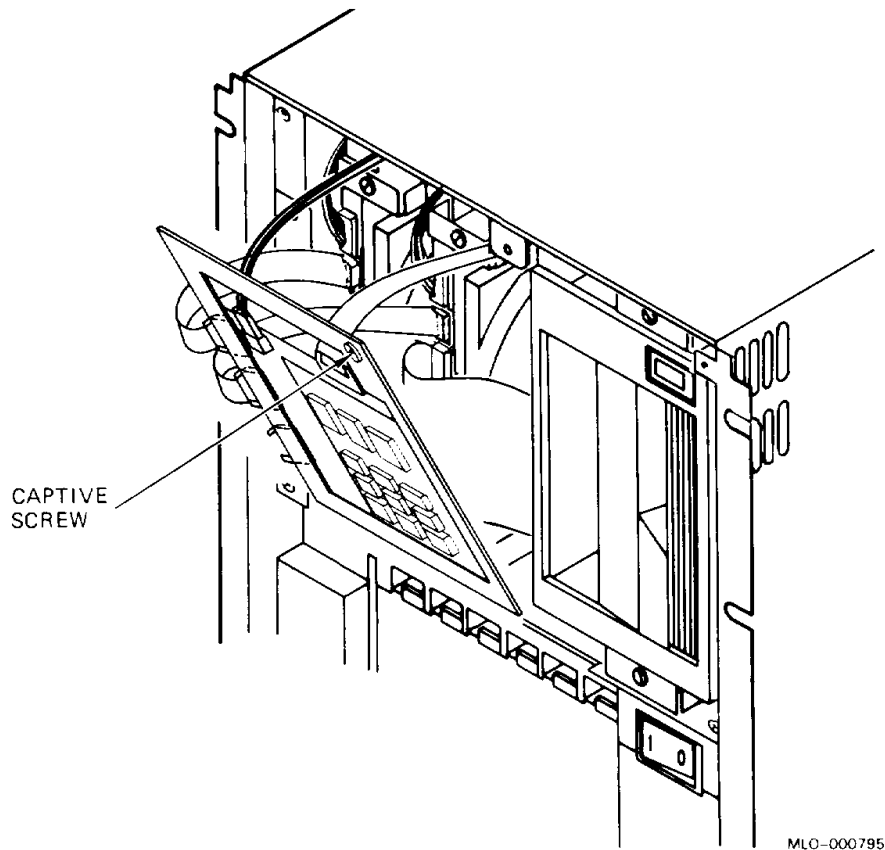
The BA215 enclosure mass storage area contains an operator control panel (OCP) for DSSI mass storage devices.

Remove the OCP from the enclosure and from its supporting frame as follows:

CAUTION: *Static electricity can damage integrated circuits. Use an antistatic wrist strap and mat when you remove the OCP.*

1. Remove the media faceplate, using the procedure in Section 3.3.2.
2. Loosen the plain-slotted captive screw that holds the top of the operator control panel (OCP) to the BA215 frame (Figure 3–9).
3. The OCP is held onto the bottom of the BA215 frame by two tabs that fit into slots on the frame. Lower the OCP, allowing the OCP to rest on its tabs (Figure 3–9).

Figure 3–9: Lowering the OCP

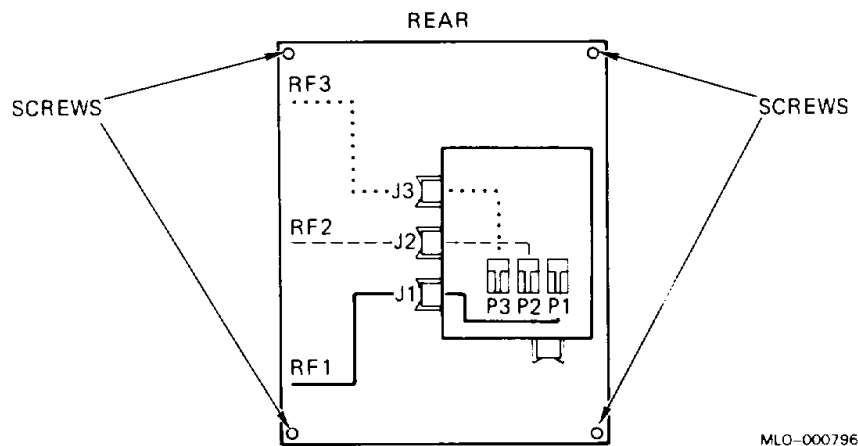


4. Label and disconnect all cables from the OCP.
5. Lift the OCP from the slots on the BA215 frame.
6. Remove the four Phillips-head screws that hold the OCP to its metal frame (Figure 3–10). Remove the OCP from the metal frame.

Installation Note

Make sure not to pinch any mass storage cabling when you secure the OCP.

Figure 3–10: Removing the OCP, RF Drives



MLO-000796

3.4.5 RF-Series Disk Drive

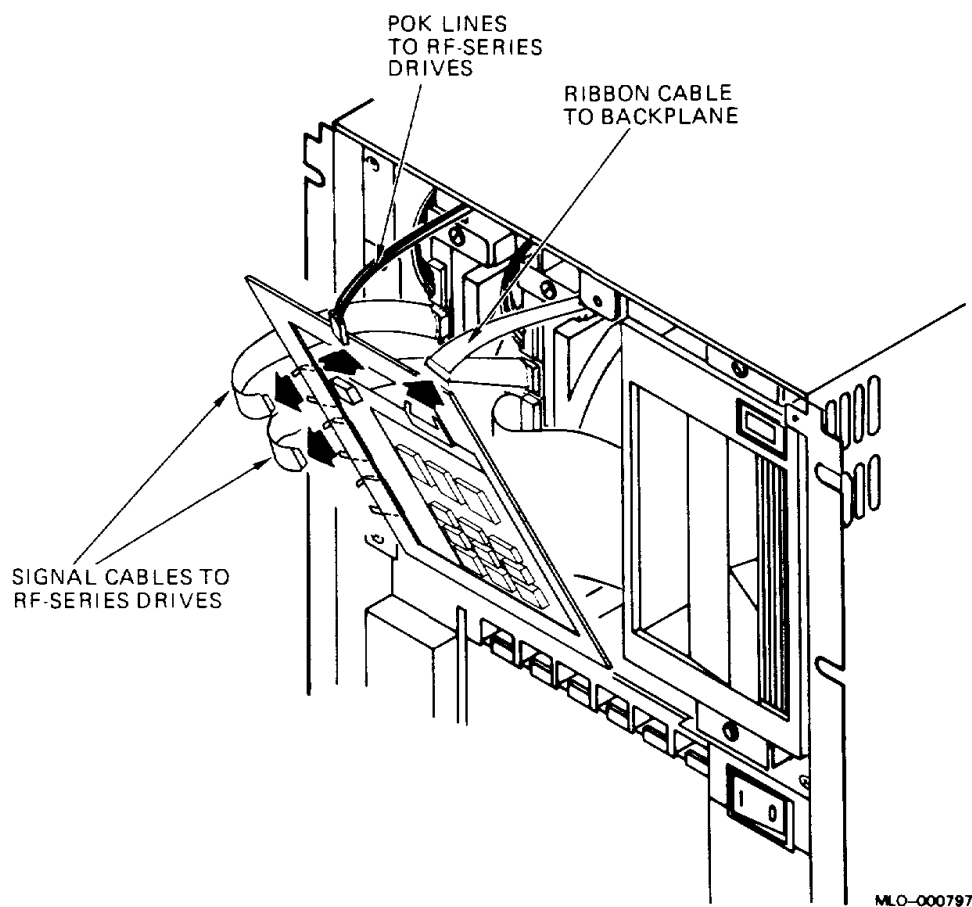
Remove an RF-series fixed-disk drive from the BA215 mass storage area as follows:

CAUTION:

- *Static electricity can damage integrated circuits. Use an antistatic wrist strap and mat when you remove or replace mass storage devices.*
- *Handle any fixed-disk drive with care; dropping or bumping the drive can damage the disk surface.*

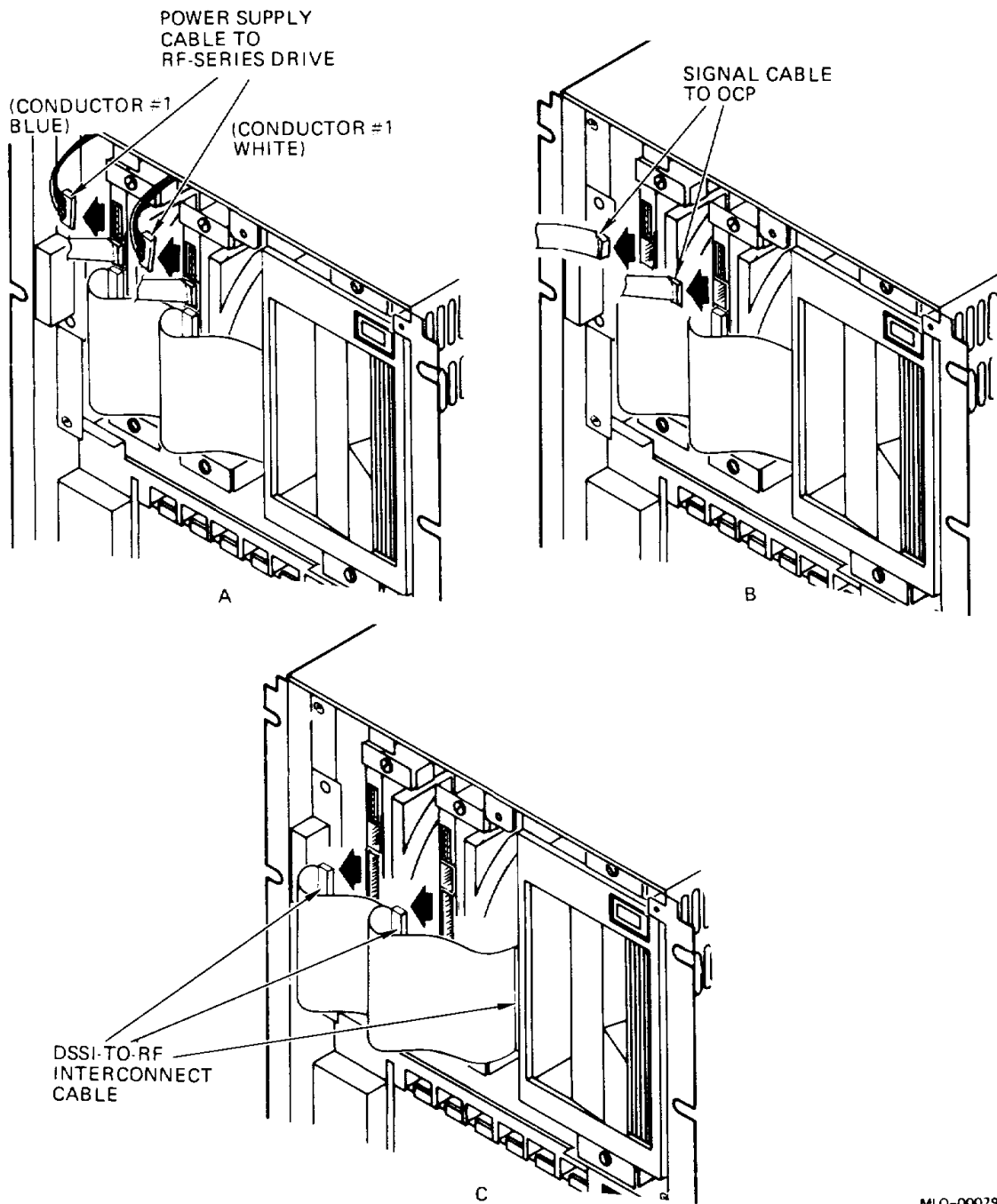
1. Remove the media faceplate, using the procedure in Section 3.3.2.
2. Lower the OCP, using steps 1 through 3 of the procedure in Section 3.4.4.
3. Label and disconnect the following lines and cables from the OCP (Figure 3–11):
 - Color-coded (red, white, and blue) POK lines; right-angle 3-pin connector.
 - Multicolored ribbon cable from backplane; center-polarized (keyed) 10-pin Berg connector.
 - Signal cables from RF-series drives; center-polarized (keyed) 10-pin Berg connector.

Figure 3-11: Removing the OCP Cabling



4. Lift the OCP from the slots on the BA215 frame, and remove.
5. Label and disconnect the following cables from the fixed-disk drives (Figure 3-12):
 - Power supply cable; 5-pin connector. Refer to A in Figure 3-12.
 - Signal cable; 10-pin connector. Refer to B in Figure 3-12.
 - DSSI-to-RF interconnect cable; 50-pin flat multi-connector. Disconnect this cable from the center chassis support plug, then from the fixed-disk drives. Refer to C in Figure 3-12.

Figure 3-12: Removing the RF-Series Drive Cabling

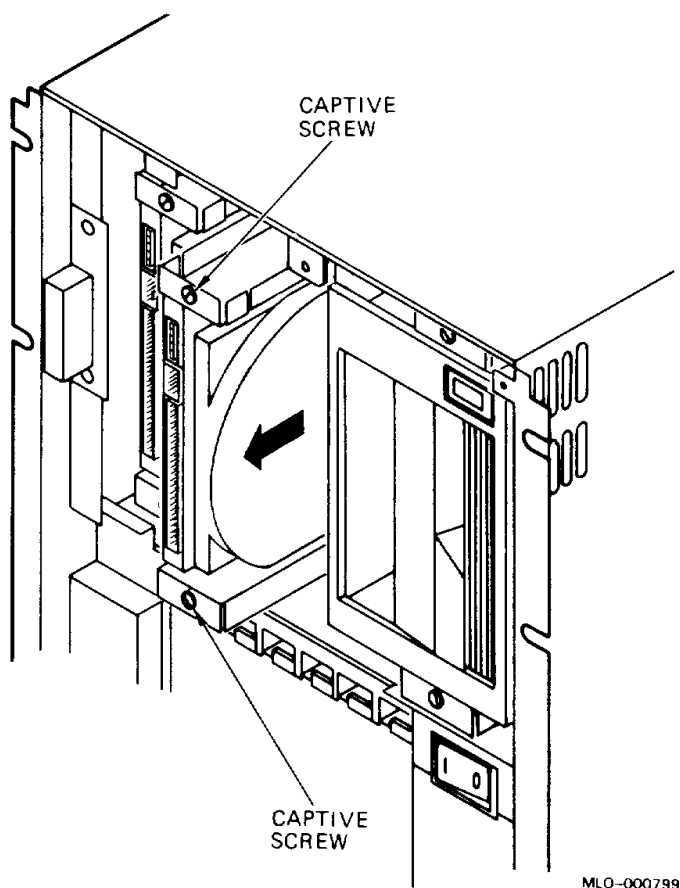


MLO-000798

6. Release the RF-series drive from the shock-resistant supports by loosening the captive screws above and below the drive (Figure 3–13).
7. Slide the drive out of the BA215 mass storage area (Figure 3–13).
8. Remove the sliding tracks from the drive and install them on the new drive.

NOTE: See *Microsystems Options* for procedures on how to remove and replace fixed-disk drive FRUs.

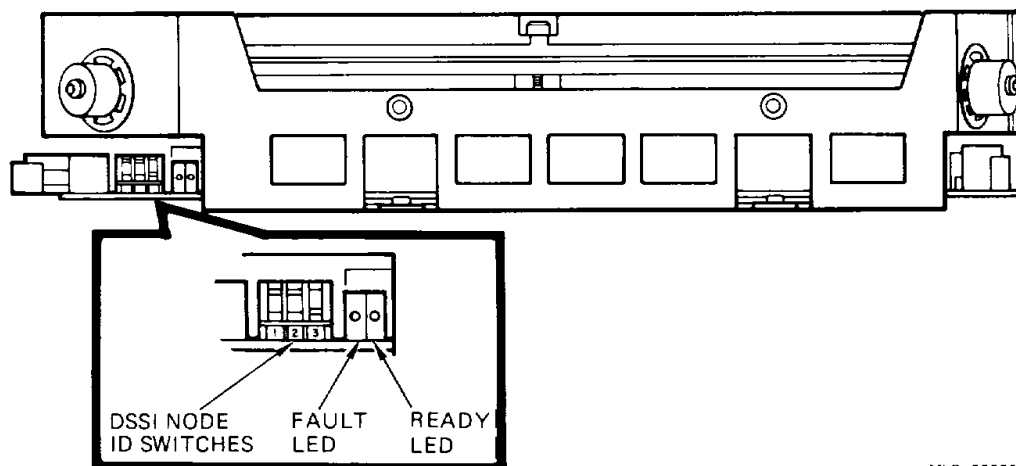
Figure 3–13: Removing an RF-Series Disk Drive



RF30 Installation Notes

DSSI node ID switches are located on the electronics controller module, at the connector end of the RF30 (Figure 3–14). Set these switches to assign a unique node ID number to each drive on the DSSI bus. Table 3–4 shows the switch settings for up to seven DSSI nodes.

Figure 3–14: RF30 ID Switches



MLO-000800

Table 3–4: RF30 Switch Settings

DSSI Node ID	Switch		
	1 (MSB)	2	3 (LSB)
0	Down	Down	Down
1	Down	Down	Up
2	Down	Up	Down
3	Down	Up	Up
4	Up	Down	Down
5	Up	Down	Up
6	Up	Up	Down
7	Up	Up	Up

RF30 drives are factory configured to the same unit ID. When installing an additional or replacement RF30, make sure the unit ID select plug on the operator control panel (OCP) and the unit ID DIP switch on the RF30 are set to the same value. Although the unit ID select plug overrides the RF30 unit ID DIP switch, it is good practice to set them to the same value. This eliminates the possibility of having a duplicate unit ID, which can occur if you disconnect the OCP from the drives and fail to set the DIP switches to the correct value.

There are eight unit ID select plugs, numbered 0 through 7; normally, the DSSI controller is node 7.

3.4.6 TK-Series Tape Drive

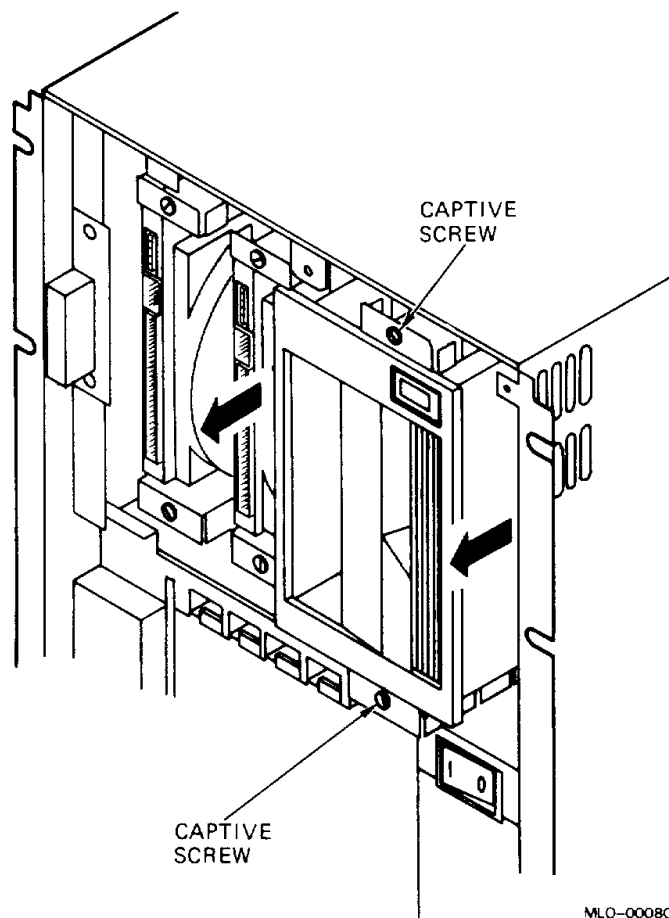
Remove a TK-series drive from the BA215 mass storage area as follows:

CAUTION:

- *Static electricity can damage integrated circuits. Use an antistatic wrist strap and mat when you remove or replace mass storage devices.*
- *Always remove a TK-series tape cartridge before you turn off the system. Never put your hands or other objects into the cartridge opening.*

1. Remove the media faceplate, using the procedure in Section 3.3.2.
2. Release the TK-series drive from its shock-resistant supports by loosening the captive screws above and below the drive (Figure 3–15).

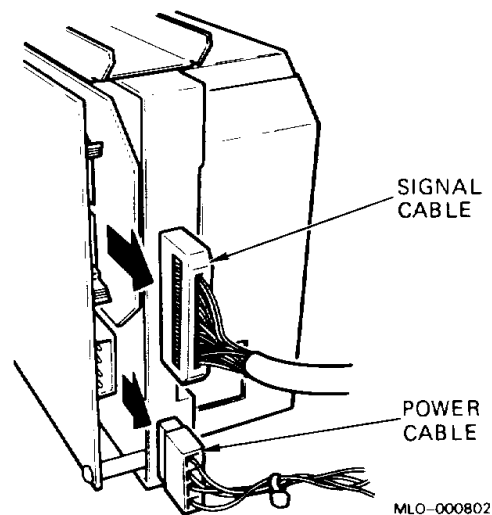
Figure 3–15: Removing the TK-Series Drive



MLO-000801

3. Slowly slide the TK-series drive part way out of the BA215 mass storage area (Figure 3-15), until you can reach the signal and power cables at the rear of the drive (Figure 3-16).
4. Label and disconnect the signal and power cables from the rear of the drive (Figure 3-16).
5. Slide the drive out of the BA215 mass storage area.
6. Remove the sliding tracks from the drive and install them on the new drive.

Figure 3-16: Removing the TK-Series Drive Cabling



Installation Notes

If the new TK-series drive is attached to a skid plate, you must: (1) remove the skid plate from the new drive, and (2) install the skid plate on the defective drive before returning the drive.

When you install a TK-series drive, make sure not to pinch any cabling at the rear of the drive. If you feel resistance when sliding the drive into the BA215, remove the drive and check to see if the cables are in the way.

3.4.7 Power Supply

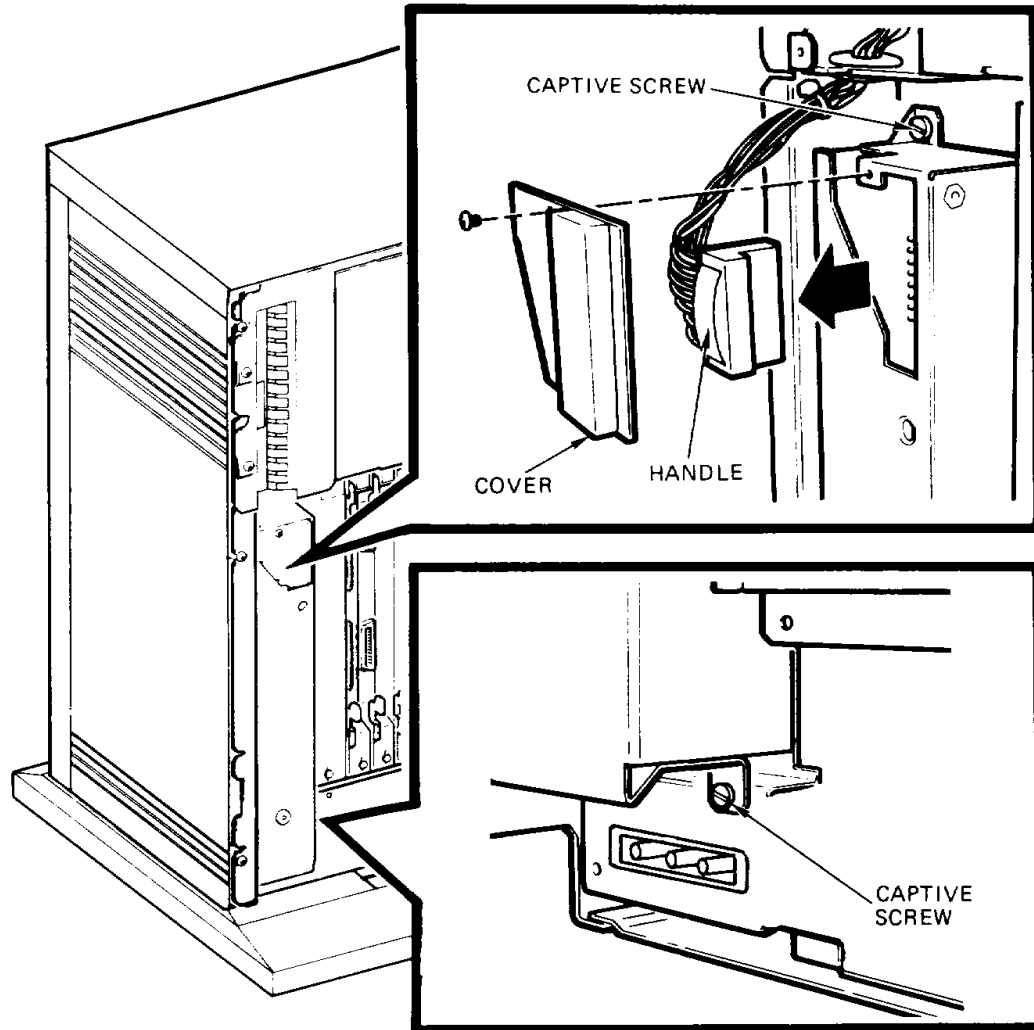
The BA215 enclosure has one power supply, described in Section 1.7.

Remove the power supply as follows:

CAUTION: *Static electricity can damage integrated circuits. Use an antistatic wrist strap and mat when you remove or replace the power supply.*

1. Remove the BA215 front panel, using the procedure in Section 3.3.1.
2. Put on the grounded wrist strap included in the Antistatic Kit (29–26246), and attach the alligator clip to the BA215 frame.
3. At the top of the power supply, remove the screw that holds the cover for the mass storage power cable; remove the cover (Figure 3–17).
4. At the top of the power supply, disconnect the power supply DSSI cable by grasping the white plastic handle on the cable connector (Figure 3–17).
5. Loosen the two flat-head captive screws that hold the power supply in place (Figure 3–17).
6. Remove the safety plate covering the fan tray assembly, using the procedure in Section 3.3.4.

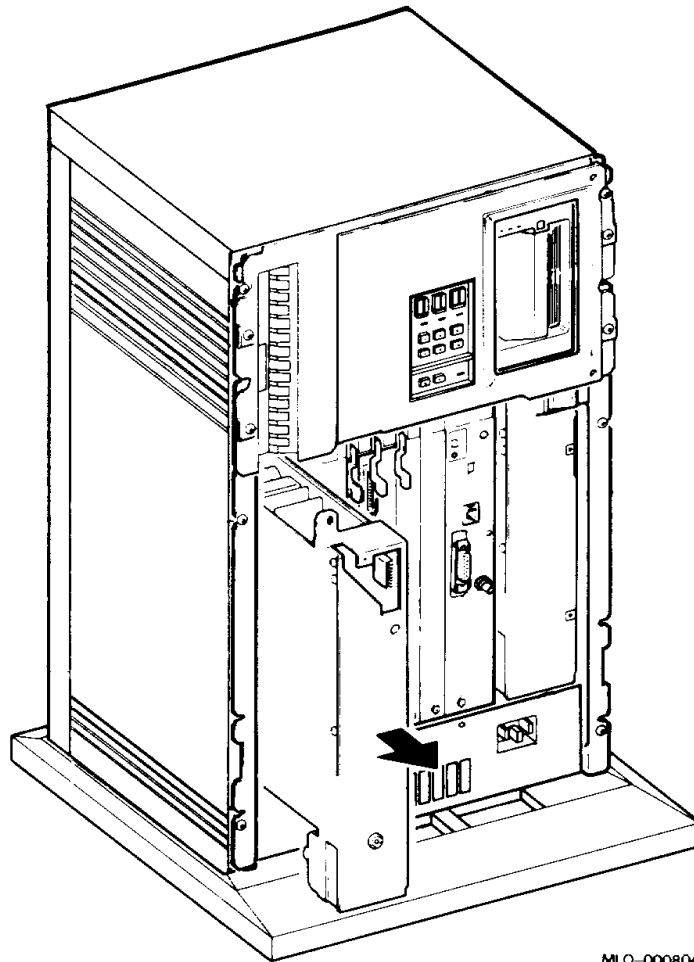
Figure 3–17: Removing the Power Supply Cabling and Screws



MLO-000803

7. The power supply connects directly to the backplane. Remove the power supply by slowly pulling it out of the enclosure, to avoid damage to the backplane connector (Figure 3–18).

Figure 3–18: Removing the Power Supply



MLO-000804

Installation Notes

Make sure you insert the top and bottom edges of the power supply into the plastic guides in the card cage.

Make sure not to pinch any cabling between the rear of the supply and the BA215 frame. If you feel resistance, remove the supply and make sure the cabling is not in the way.

The power supply DSSI cable is keyed; be careful to connect it correctly.

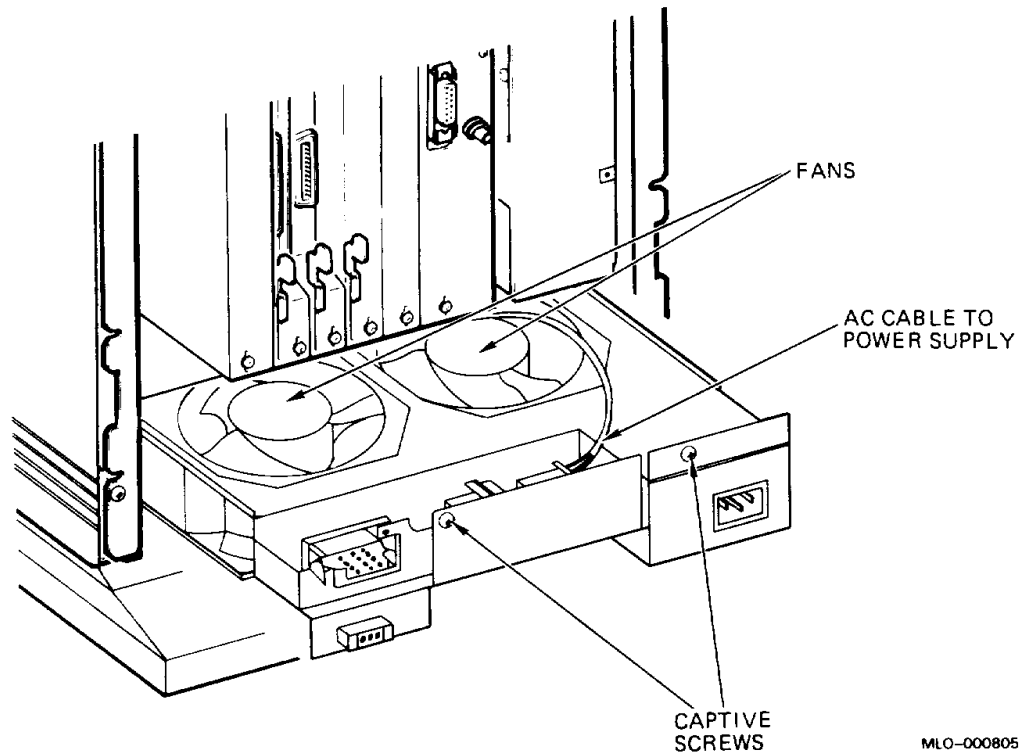
3.4.8 Fan Tray Assembly

The fan tray assembly, which houses the two dc fans and the ac line filter, is located behind the safety plate at the bottom of the BA215 enclosure.

Remove the fan tray assembly as follows:

1. Remove the power supply, using the procedure in Section 3.4.7.
2. Loosen the two Phillips-head captive screws that hold the fan tray assembly to the bottom of the card cage (Figure 3–19).
3. Carefully pull the complete assembly forward; the attached cables will prevent you from removing it completely.
4. Disconnect the ac cable to the power supply (Figure 3–19).

Figure 3–19: Removing the Fan Tray Assembly



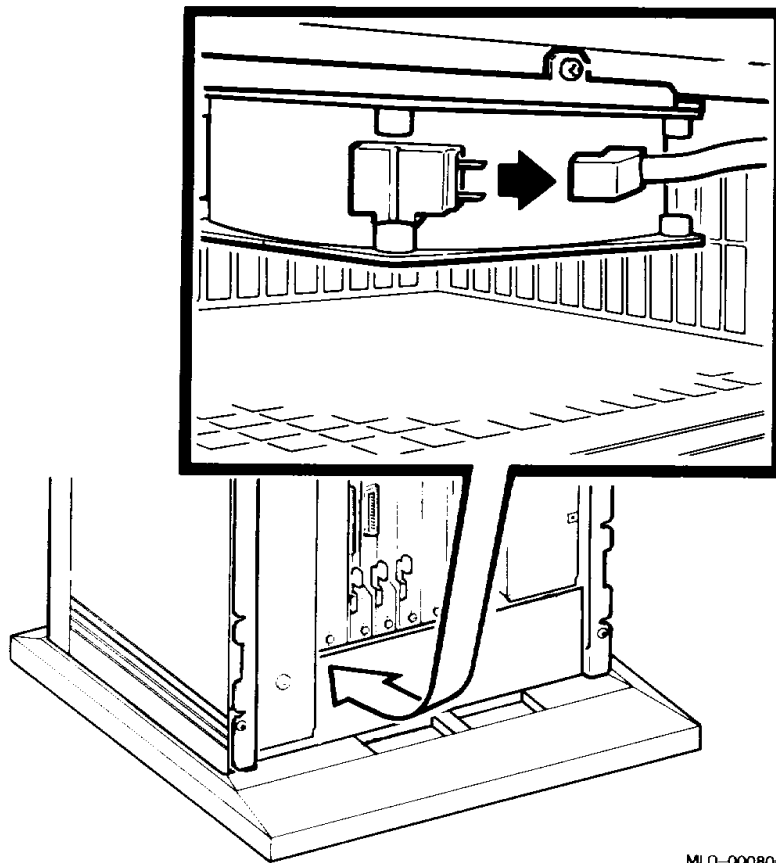
MLO-000805

5. Remove the fan tray assembly from the enclosure.

The two dc fans are surrounded by sheet metal in the fan tray assembly (Figure 3–19). Remove the fans from the fan tray assembly as follows:

1. Note the orientation (+ or –) of the Y-cable connectors on the two fans. Disconnect the Y-cables from the two fans (Figure 3–20).
2. Remove the eight screws (four on each fan). Remove the fans from the sheet metal.

Figure 3–20: Removing the Fan Cable from the Fan Tray Assembly



MLO-000806

3.4.9 On/Off Switch Assembly

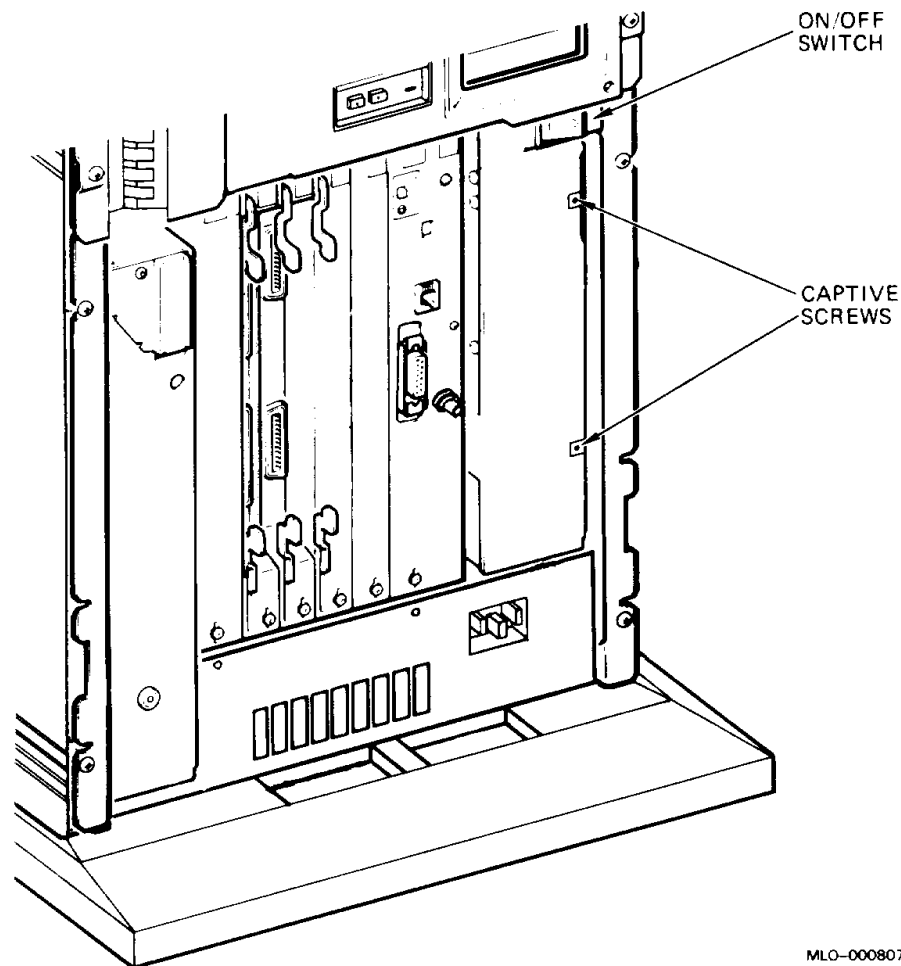
The BA215 enclosure on/off switch assembly is located just below the mass storage area, on the right.

Remove the on/off switch assembly as follows:

1. Remove the power supply, using the procedure in Section 3.4.7.

2. Pull the fan tray assembly forward and disconnect the ac power supply cable, using steps 1 through 4 of the procedure in Section 3.4.8.
3. Loosen the two captive screws on the sheet metal panel attached to the on/off switch assembly (Figure 3–21).
4. Pull the sheet metal panel away from the BA215 frame.
5. From the back of the on/off switch assembly, push up on the bottom of the plastic switch and remove the assembly from the sheet metal panel.

Figure 3–21: On/Off Switch Assembly Screws



MLO-000807

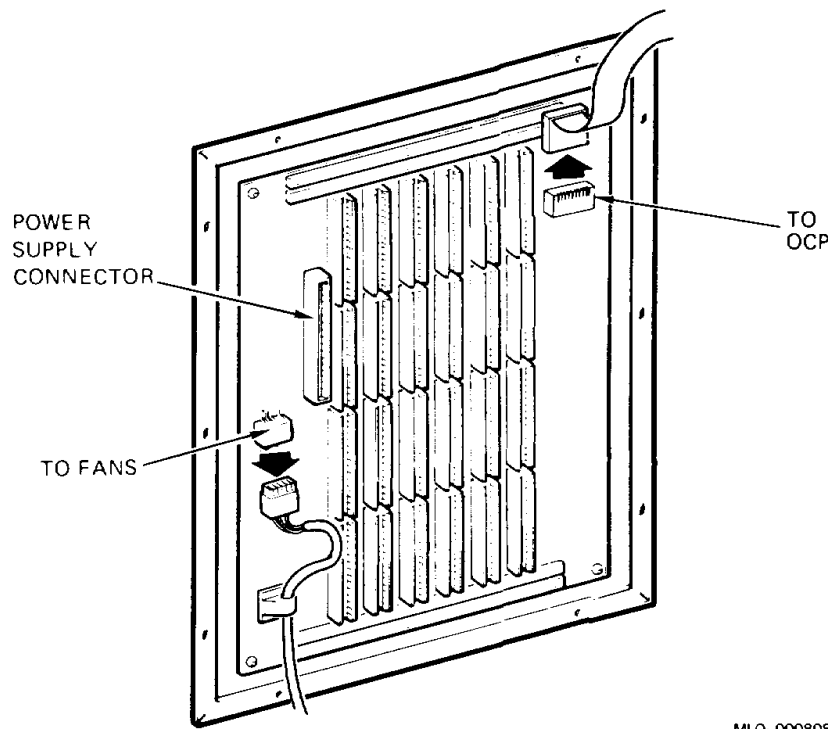
3.4.10 Backplane

The backplane is the only part of the BA215 enclosure that you remove from the rear of the enclosure.

Remove the backplane as follows:

1. From the front of the enclosure:
 - a. Remove the side and top panel unit, using the procedure in Section 3.3.3.
 - b. Remove all modules from the backplane, using the procedures in Sections 3.4.1 through 3.4.3.
 - c. Reach through the card cage, and disconnect the fan cable and OCP cable from the backplane (Figure 3–22).

Figure 3–22: Disconnecting the Backplane Cables

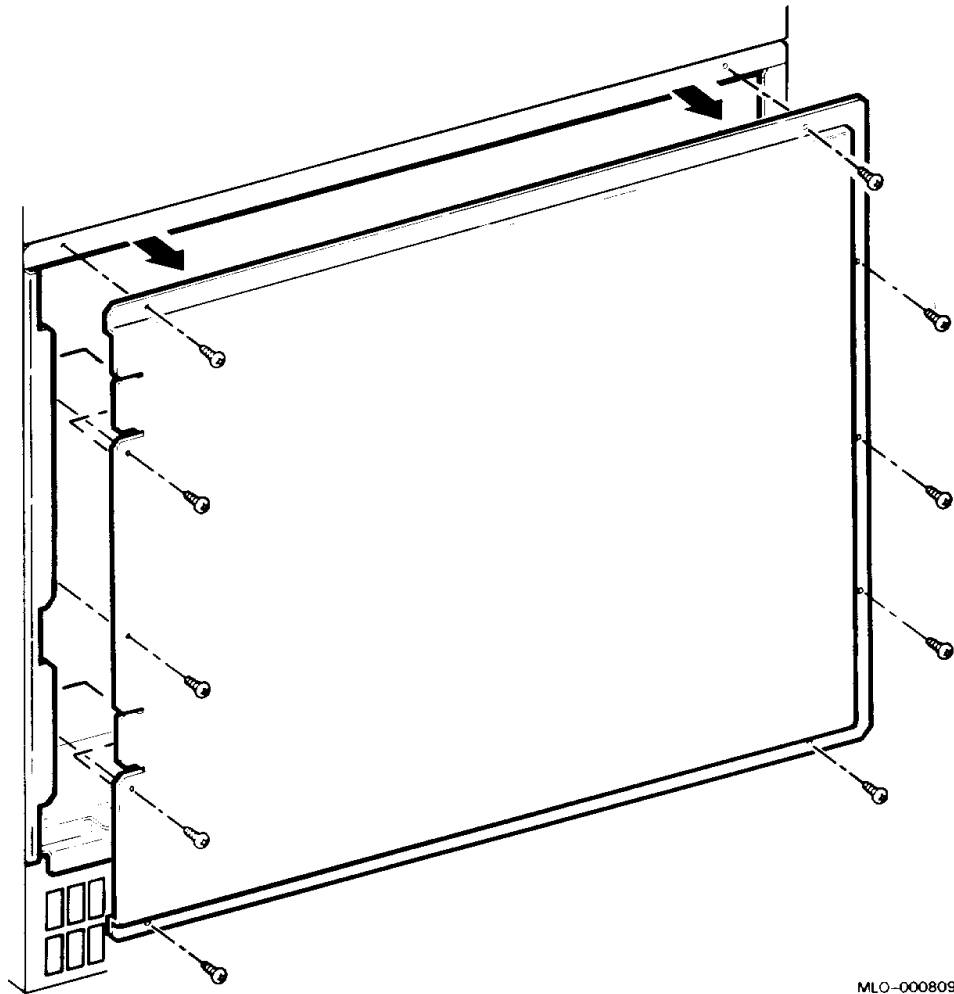


MLO-000808

2. Read the Caution below. Then, from the rear of the enclosure, remove the ten Phillips-head screws that hold the metal plate and backplane to the rear of the enclosure (Figure 3–23). The backplane and metal plate are one FRU; do not remove the plate from the backplane.

CAUTION: *The metal plate and backplane rest on two metal tabs on the BA215 frame, to prevent the assembly from dropping when you remove the last screw. Remove the lower screws first, then the middle screws; remove the upper screws last. Make sure the metal plate and backplane are supported by the tabs before you remove the last screw.*

Figure 3–23: Removing the Backplane



Installation

1. Align the new backplane assembly with the rear of the enclosure. Make sure the bottom of the backplane assembly rests on the BA215 frame tabs.
2. While you support the backplane assembly, insert and tighten the ten screws part way.
3. Insert quad-height modules into slots 1 and 6.
4. Fully tighten all backplane screws.
5. Install the power supply by reversing the removal procedure in Section 3.4.7.
6. Properly configure and install all modules, module covers, and filler panels.

Appendix A

Related Documentation

The following documents contain information relating to MicroVAX or MicroPDP-11 systems.

Document Title	Order Number
Modules	
CXA16 Technical Manual	EK-CAB16-TM
CXY08 Technical Manual	EK-CXY08-TM
DEQNA Ethernet User's Guide	EK-DEQNA-UG
DHV11 Technical Manual	EK-DHV11-TM
DLV11-J User's Guide	EK-DLV1J-UG
DMV11 Synchronous Controller Technical Manual	EK-DMV11-TM
DMV11 Synchronous Controller User's Guide	EK-DMV11-UG
DPV11 Synchronous Controller Technical Manual	EK-DPV11-TM
DPV11 Synchronous Controller User's Guide	EK-DPV11-UG
DRV11-J Interface User's Manual	EK-DRV1J-UG
DRV11-WA General Purpose DMA User's Guide	EK-DRVWA-UG
DZQ11 Asynchronous Multiplexer Technical Manual	EK-DZQ11-TM
DZQ11 Asynchronous Multiplexer User's Guide	EK-DZQ11-UG
DZV11 Asynchronous Multiplexer Technical Manual	EK-DZV11-TM
DZV11 Asynchronous Multiplexer User's Guide	EK-DZV11-UG
IEU11-A/IEQ11-A User's Guide	EK-IEUQ1-UG
KA630-AA CPU Module User's Guide	EK-KA630-UG
KA640-AA CPU Module User's Guide	EK-KA640-UG
KA650-AA CPU Module User's Guide	EK-KA650-UG
KDA50-Q CPU Module User's Guide	EK-KDA5Q-UG
KDJ11-B CPU Module User's Guide	EK-KDJ1B-UG
KDJ11-D/S CPU Module User's Guide	EK-KDJ1D-UG
KDF11-BA CPU Module User's Guide	EK-KDFEB-UG
KMV11 Programmable Communications Controller User's Guide	EK-KMV11-UG
KMV11 Programmable Communications Controller Technical Manual	EK-KMV11-TM

Document Title	Order Number
Modules	
LSI-11 Analog System User's Guide	EK-AXV11-UG
Q-Bus DMA Analog System User's Guide	EK-AV11D-UG
RQDX2 Controller Module User's Guide	EK-RQDX2-UG
RQDX3 Controller Module User's Guide	EK-RQDX3-UG
Disk and Tape Drives	
RA60 Disk Drive Service Manual	EK-ORA60-SV
RA60 Disk Drive User's Guide	EK-ORA60-UG
RA81 Disk Drive Service Manual	EK-ORA81-SV
RA81 Disk Drive User's Guide	EK-ORA81-UG
SA482 Storage Array User's Guide (for RA82)	EK-SA482-UG
SA482 Storage Array Service Manual (for RA82)	EK-SA482-SV
RC25 Disk Subsystem User's Guide	EK-ORC25-UG
RC25 Disk Subsystem Pocket Service Guide	EK-ORC25-PS
RRD50 Subsystem Pocket Service Guide	EK-RRD50-PS
RRD50 Digital Disk Drive User's Guide	EK-RRD50-UG
RX33 Technical Description Manual	EK-RX33T-TM
RX50-D, -R Dual Flexible Disk Drive Subsystem Owner's Manual	EK-LEP01-OM
TK50 Tape Drive Subsystem User's Guide	EK-LEP05-UG
TS05 Tape Transport Pocket Service Guide	EK-TSV05-PS
TS05 Tape Transport Subsystem Technical Manual	EK-TSV05-TM
TS05 Tape Transport System User's Guide	EK-TSV05-UG

Document Title	Order Number
Systems	
MicroVAX Special Systems Maintenance	EK-181AA-MG
630QB Maintenance Print Set	MP-02071-01
630QE Maintenance Print Set	MP-02219-01
630QY Maintenance Print Set	MP-02065-01
630QZ Maintenance Print Set	MP-02068-01
BA23 Enclosure Maintenance	EK-186AA-MG
BA123 Enclosure Maintenance	EK-188AA-MG
BA213 Enclosure Maintenance	EK-189AA-MG
BA214 Enclosure Maintenance	EK-190AA-MG
BA215 Enclosure Maintenance	EK-191AA-MG
H9642-J Cabinet Maintenance	EK-187AA-MG
H9644 Cabinet Maintenance	EK-221AA-MG
KA630 CPU System Maintenance	EK-178AA-MG
KA640 CPU System Maintenance	EK-179AA-MG
KA650 CPU System Maintenance	EK-180AA-MG
KDF11-B CPU System Maintenance	EK-245AA-MG
KDJ11-D/S CPU System Maintenance	EK-246AA-MG
KDJ11-B CPU System Maintenance	EK-247AA-MG
MicroPDP-11 Hardware Information Kit (for BA23)	00-ZYAAA-GZ
MicroPDP-11 Hardware Information Kit (for BA123)	00-ZYAAB-GZ
MicroPDP-11 Hardware Information Kit (for H9642-J)	00-ZYAAE-GZ
MicroPDP-11 Hardware Information Kit (for BA213)	00-ZYAAS-GZ
Microsystems Options	EK-192AA-MG
Microsystems Site Preparation Guide	EK-O67AB-PG
MicroVAX II Hardware Information Kit (for BA23)	00-ZNAAA-GZ
MicroVAX II Hardware Information Kit (for BA123)	00-ZNAAB-GZ
MicroVAX II Hardware Information Kit (for H9642-J)	00-ZNAAE-GZ
MicroVAX 3500 Customer Hardware Information Kit	00-ZNAES-GZ
MicroVAX 3600 Customer Hardware Information Kit (for H9644)	00-ZNAEF-GZ
VAXstation 3200 Owner's Manual (BA23)	EK-154AA-OW
VAXstation 3500 Owner's Manual (BA213)	EK-171AA-OW
VAXstation II/GPX Owner's Manual (BA23)	EK-106AA-OW
VAXstation II/GPX Owner's Manual (BA123)	EK-105AA-OW

Document Title	Order Number
Diagnostics	
DEC/X11 Reference Card	AV-F145A-MC
DEC/X11 User's Manual	AC-FO53D-MC
XXDP User's Manual	AZ-GNJAA-MC
XXDP DEC/X11 Programming Card	EK-OXXDP-MC
MicroVAX Diagnostic Monitor Ethernet Server User's Guide	AA-FNTAC-DN
MicroVAX Diagnostic Monitor Reference Card	AV-FMXAA-DN
MicroVAX Diagnostic Monitor User's Guide	AA-FM7AB-DN
Networks	
Ethernet Transceiver Tester User's Manual	EK-ETHTT-UG
VAX/VMS Networking Manual	AA-Y512C-TE
VAX NI Exerciser User's Guide	AA-HI06A-TE

B

- BA215 enclosure
 - description of, 1-1
 - dimensions of, 2-1
 - procedure for unpacking, 2-4
 - weight of, 2-1
- Backplane
 - ac loads, 1-11
 - connectors, 1-11
 - dc loads, 1-11
 - description of, 1-11
 - installation of, 3-32
 - Q/CD slots, 1-11
 - removal of, 3-30
- Baud rate, 1-13

C

- Configuration
 - guidelines, 1-22
 - module order and, 1-23
- Configuration worksheet, 1-25
 - use of, 1-23
- Console terminal, connecting, 2-6
- Controls and indicators
 - for RF-series drives, 1-16
 - on OCP, 1-13
 - system, 1-12
- Covers
 - See Module covers
- CPU I/O panel
 - H3602-SA, 2-6
 - removal of, 3-13
- CXA16 cable connections, 2-7

D

- Devices, procedure for connecting, 2-6
- Dimensions, BA215 enclosure, 2-1
- DSSI
 - See Mass storage devices
- Dual-height modules
 - support panel for, 1-6

E

- Electrical requirements, 2-3
- External device connector, 1-7

F

- Fans
 - and temperature sensor, 1-21
 - description of, 1-21
 - housing for, 1-17
 - removal of, 3-28
- Fan tray assembly
 - description of, 1-17
 - removal of, 3-27
- Field replaceable units (FRUs)
 - part numbers for, 3-1
 - shock-mounting hardware for, 3-3
 - system-specific, 3-2
- Filler panel
 - description of, 1-6
 - installation of, 3-11
- Front panel
 - attaching to BA215 enclosure, 2-9
 - removal of, 3-3
 - universal key positions on, 1-12
 - window, lowering, 1-12

H

Hardware, shock-mounting, 3-3

I

Installation

- electrical requirements for, 2-3
- of additional devices, 2-6
- of cables for external devices, 2-7
- of console terminal, 2-6
- of front panel, 2-9
- of power cord, 2-9

M

Mass storage

- and power supply DSSI cabling, 1-20
- POK connector on OCP, 1-20
- typical configuration of, 1-10

Mass storage devices

- DSSI support for, 1-1
- enclosure capacity for, 1-6
- shock-mounting hardware for, 1-9
- supported by BA215, 1-8

Media faceplate, removal, 3-4

Module covers

- description of, 1-3, 1-4
- filler panel for, 1-6
- removal of, 3-13
- types of, 1-3
- variations in, 1-4

Module handles

- and filler panel installation, 3-11
- description of, 1-3
- filler panel for, 1-6
- removal of, 3-10
- types of, 1-3
- variations in, 1-4

Modules

- and filler panel requirement for, 3-11

dual-height, support panel for, 1-6

handles and covers, 1-3, 1-4

order of in backplane, 1-23

removal of, 3-13

with covers, removal of, 3-13

with handles, removal of, 3-10

O

OCP

See Operator control panel

On/off switch assembly

removal of, 3-28

Operator control panel (OCP)

- connectors, 1-16
- controls and indicators for, 1-13
- description of, 1-13
- POK connector, 1-20
- removal of, 3-15

Options

power and bus load limits, 1-24

P

Part numbers

- of field replaceable units (FRUs), 3-1
- of shock-mounting hardware, 3-3
- of system-specific FRUs, 3-2

POK connector, 1-20

Power cord, connecting, 2-9

Power cords, 240 Vac, 2-3

Power supply

- backplane connector for, 1-17
- controls and indicators, 1-20
- description of, 1-17
- fan tray assembly for, 1-17
- installation of, 3-26
- maximum current of, 1-17
- power cords, 240 Vac, 2-3
- removal of, 3-24

Power supply (cont'd.)
 shutdown sequence, 1-19
 timing diagram, 1-20
Power-up mode select, 2-9

R

RF30 fixed-disk drive, installation
 of, 3-20
RF-series fixed-disk drive
 controls and indicators for, 1-16
 removal of, 3-17
 shock-mounting hardware for,
 1-9

S

Safety plate, removal of, 3-8
Shipping brackets, releasing, 3-5
Shock-mounting hardware, 1-9, 3-3
Side and top panel unit, removal,
 3-7
Site preparation
 and acoustic levels, 2-2
 and clearance requirements, 2-1
 and electrical requirements, 2-3
 and enclosure clearance, 2-1
 and enclosure dimensions, 2-1
 and heat dissipation, 2-3
 and power cords, 240 Vac, 2-3
Support panel for dual-height
 modules, 1-6
System controls, setting, 2-9

T

TK-series tape drive
 installation of, 3-23
 removal of, 3-22
 shock-mounting hardware for,
 1-9

U

Universal key, 1-13
Unpacking the BA215, 2-4

W

Weight, BA215 enclosure, 2-1
Worksheet for BA215 configuration,
 1-25

NOTES

HOW TO ORDER

ADDITIONAL DOCUMENTATION

From	Call	Write
Alaska, Hawaii, or New Hampshire	603-884-6660	Digital Equipment Corporation P.O. Box CS2008 Nashua, NH 03061
Rest of U.S.A. and Puerto Rico*	1-800-DIGITAL	
* Prepaid orders from Puerto Rico must be placed with DIGITAL's local subsidiary (809-754-7575)		
Canada	800-267-6219 (for software documentation) 613-592-5111 (for hardware documentation)	Digital Equipment of Canada Ltd. 100 Herzberg Road Kanata, Ontario, Canada K2K 2A6 Attn: Direct Order desk
Internal orders (for software documentation)	—	Software Distribution Center (SDC) Digital Equipment Corporation Westminster, MA 01473
Internal orders (for hardware documentation)	DTN: 234-4323 (508) 351-4323	Publishing & Circulation Serv. (P&CS) NR03-1/W3 Digital Equipment Corporation Northboro, MA 01532

Reader's Comments

BA215 Enclosure Maintenance
EK-191AA-MG-001

Your comments and suggestions will help us improve the quality of our future documentation. Please note that this form is for comments on documentation only.

I rate this manual's:	Excellent	Good	Fair	Poor
Accuracy (product works as described)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Completeness (enough information)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clarity (easy to understand)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Organization (structure of subject matter)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Figures (useful)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Examples (useful)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Index (ability to find topic)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Page layout (easy to find information)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

What I like best about this manual: _____

What I like least about this manual: _____

My additional comments or suggestions for improving this manual:

I found the following errors in this manual:

Page	Description
_____	_____
_____	_____
_____	_____

Please indicate the type of user/reader that you most nearly represent:

- | | |
|---|---|
| <input type="checkbox"/> Administrative Support | <input type="checkbox"/> Scientist/Engineer |
| <input type="checkbox"/> Computer Operator | <input type="checkbox"/> Software Support |
| <input type="checkbox"/> Educator/Trainer | <input type="checkbox"/> System Manager |
| <input type="checkbox"/> Programmer/Analyst | <input type="checkbox"/> Other (please specify) _____ |
| <input type="checkbox"/> Sales | |

Name/Title _____ Dept. _____

Company _____ Date _____

Mailing Address _____

Phone _____

Do Not Tear — Fold Here and Tape

digitalTM



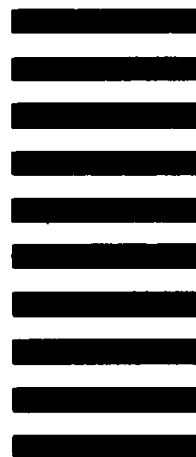
NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO.33 MAYNARD MASS.

POSTAGE WILL BE PAID BY ADDRESSEE

**DIGITAL EQUIPMENT CORPORATION
CORPORATE USER PUBLICATIONS
MLO5-5/E45
146 MAIN STREET
MAYNARD, MA 01754-2571**



Do Not Tear — Fold Here

Cut Along Dotted Line